

COLONIC THERAPY
IN THE
TREATMENT OF DISEASE

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COLONIC THERAPY
IN THE
TREATMENT OF DISEASE

BY
O. BOTO SCHELLBERG

NEW YORK
AMERICAN INSTITUTE OF MEDICINE, INC.
1923

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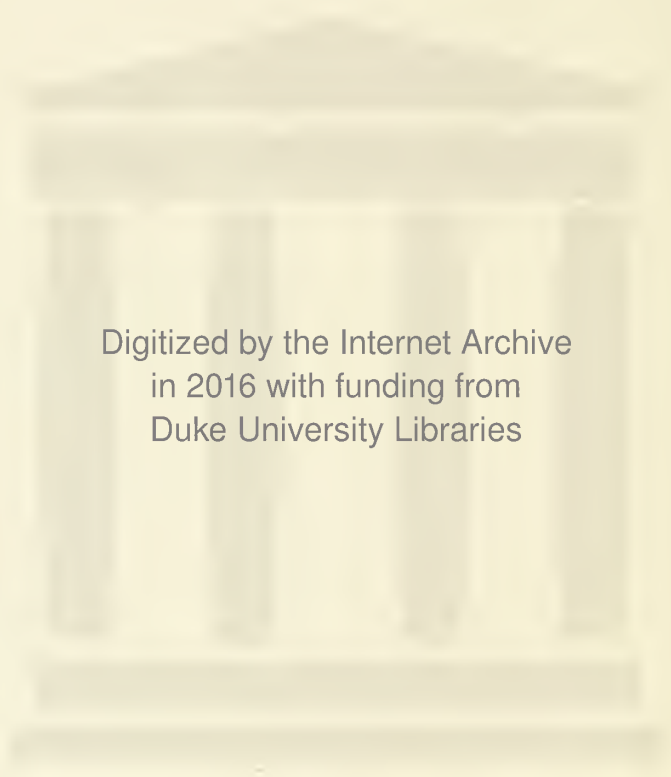
THIS BOOK IS GRATEFULLY DEDICATED

TO

THOSE MEN AND WOMEN OF THE MEDICAL PROFESSION

Who, with inexhaustible patience and good will, and with no thought of recompense other than the benefit to humanity, found time, notwithstanding their devotion to their own scientific pursuits, to help me in solving the many problems that arose in the development of the technic herein described.

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CHAPTER I

THE EVOLUTION OF THE ALIMENTARY CANAL

Darwin's law of divergence linked to Osborn's law of "adaptative radiation"—Adaptation of man to his environment largely a matter of modification of his digestive apparatus to meet dietary requirements—Crile's observations upon the crudeness of certain natural mechanisms—Comparative intestinal anatomy of certain Australian animals—Most important cecal changes noted in the wombat, koala and Tasmanian devil—Man's intellect has enabled him to alter his dietary conditions—Present day methods of food preparation have a strong influence on digestive function—Cell metabolism is regulated by a specialized group of organs—All forms of life dependent upon bacteria—Beneficent and harmless bacteria may become malignant if their host's vitality is lowered—Intestinal foci of infection frequently overlooked.

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More than half a century ago Darwin, seeking to interpret in the light of the current morphology of his time the facts that he had demonstrated in regard to variability and the theory of natural selection, said: "We must look at every complicated mechanism and instinct as the summary of a long history of useful contrivances, much like a

work of art.”¹ Yet, in examining the works of Darwin, we find that his conclusions give little consideration to such problems as functional adaptation and the correlation of parts. It remained for a man of our own time and country to link the law of divergence which Darwin had demonstrated, to his own law of “adaptative radiation,” thus establishing what Russell has termed “a brilliant vindication of the functional point of view.”²

“According to this law,” says Henry Fairfield Osborn, “each isolated region, if large and sufficiently varied in its topography, soil, climate, and vegetation, will give rise to a diversified mammalian fauna. From primitive central types, branches will spring off in all directions, with teeth and prehensile organs modified to take advantage of every possible opportunity of securing food, and in adaptation of the body, limbs and feet to habitats of every kind. The larger the region and the more diverse the conditions, the greater the variety of mammals which will result. The most primitive mammals were probably insectivorous or omnivorous forms, therefore with simple, short-crowned teeth, of slow-moving, ambulatory, terrestrial or arboreal habit, and with short feet provided with claws. . . . In the case of teeth, insectivorous and omnivorous types appear to be more central and ancient than either the exclu-

sively carnivorous or herbivorous types. Thus, the extremes of carnivorous adaptation, as in the case of the cats; of omnivorous adaptation, as in the case of the bears; of herbivorous adaptation, as in the case of the horses; or myrmecophagous adaptation, as in the case of the ant-eaters, are all secondary.”³

It is toward the end of this secondary stage of adaptation that we are able to visualize man as he emerges from among his fellow creatures and becomes differentiated as a separate and dominant genus. The history of man's emergence has been diligently studied, and the tale of it frequently related, but the variations in his diet and the modifications which took place in the structure of his digestive apparatus, in consequence of the ingestion of the materials of this diet, do not usually receive the consideration that their importance in the plan of human development would seem to warrant. It is by no means unreasonable to suppose that it was because of the adaptability of his digestive apparatus that man was able to rise to his position of superiority over the other animals. As Crile has expressed it:

“From colloidal slime to man is a long road, the conception of which taxes our imaginations to the utmost. Indeed, the problems of the missing links are not so difficult as is the origin of the organs and functions which man has acquired as products

of adaptation. For whether we look upon the component parts of our present bodies as useful or useless mechanisms, we must regard them as the result of age-long conflicts between environmental forces and organisms.

“In the first delight of finding a rich display of beautiful and ingenious mechanisms for the preservation of life in plants and animals, we are prone to overestimate the ‘marvelous efficacy’ of these contrivances, and to ignore the presence of many imperfect and involved mechanisms which make life precarious for the average organism. For example, what a vast amount of superfluous energy has apparently been wasted in making the long-distance arrangement for fertilization in certain plants, which first produce flowers by which to attract insects on the chance that they may brush against the pollen and carry it to another flower!” To this writer it seems that some of the mechanisms of human bodies are equally crude: “the twenty feet or more of intestine which give harborage to poisonous gases and germs”; or perhaps those structures which, serviceable in early life, become cumbersome and dangerous if they survive in adult development, like the thymus gland or faucial tonsil. “If the result of man’s haphazard assemblage of organs is to some extent adequate to the needs of his present environment, it is because during the age-long process of evolution all

the fatally awkward combinations have been eliminated by a struggle so keen that the slightest variation in the length of a leaf, the strength of a limb or the color of an egg, has given the victory to a rival species. Throughout this struggle, survival has depended on one of two conditions: the possession of extreme stability, the quality of withstanding all destructive forces in the environment; or, the possession of lability, the quality of adaptability to various conditions in the environment. Rocks are an example of the first condition; man and the higher animals of the second.”⁴

Yet, comparison of human physical development with that of other animals might lead us to conclusions somewhat different from those to which Crile's investigations and reflections have conveyed him. Some years ago, Stapley and MacKenzie,⁵ two—at that time—relatively obscure physicians of Australia, made a study of certain animals native to the Australian continent, with a view to determining some of the developmental changes which had taken place in the cecums and vermiform appendices of these creatures. Since Australia is—paleontologically speaking—much younger and newer than any other part of our world, a study of the animal forms which are still in existence upon that continent enables one to observe transitional epochs of development which would be impossible under any other conditions.

These authors confined their investigations to the monotremes—the lowest existing order of mammals, oviparous and having only rudimentary mammary glands—and the marsupials—a genus distinguished by being provided with a marsupium, or pouch, for the conveyance and nourishment of the young.

The marsupials presented variations in bowel structure, ranging all the way from enormous cecal development to the entire obliteration of that organ. The most important cecal changes were observed in the *wombat*, the *koala*—the native Australian bear which does not hibernate—and the *Tasmanian devil*. The authors preferred not to consider a comparison of the cecum of the kangaroo, which is the best known representative of the marsupials, with that of others of the same genus having simple stomachs, as the stomach of the kangaroo is sacculated to such an extent that it resembles the cecum of a horse, and it is their belief that the forms of both stomach and cecum are largely dominated by the sphincteration of which this sacculaton is the result.

The wombat possesses a true vermiform appendix of a structure similar to that of man's; the koala shows enormous cecal development, but he has no appendix; the Tasmanian devil has neither cecum nor vermiform appendix; the stomach of the koala is like that of the wombat, while "the

cecum of the wombat and that of man are alike in their architecture," each showing sacculations and muscle bands terminating in the appendix. The wombat, unlike the koala, "does not live in trees; it enjoys life in a hole in the ground." It is very fond of fern root—a diet said to have been commonly used by the Maoris of New Zealand—but it eats other things as well, while the koala possesses no adaptability as to diet. "He must have forest gum leaves of his own selection. They are essential to his life. Upon this highly selected diet the koala has attained a cecum of enormous development, also a large colon, guarded toward the outlet by a long sphincteration. This wonderful cecum and colon are doubtless organs working at great economy, extracting from gum leaves that pabulum with which to build up the complex tissues of the native bear. The cecum shows no evidence of reduction in size from a larger type; on the contrary, it possesses longitudinal bands of mucous membrane which readily allow of greater bowel distention." It is the belief of the authors that a true vermiform appendix cannot come into existence without longitudinal muscle bands on the cecum, extending as far as the cecal apex or beyond it. Investigation of the digestive apparatus of the Tasmanian devil showed that "this fierce marsupial lives entirely on flesh and fish. Simplicity dominates the form of its digestive tract,

no differentiation of large from small gut showing. Its digestive apparatus is a simple tube with a simple stomach, the tube being practically without sphincteration. . . .

“The wombat, with its vermiform appendix and its varied diet, possesses the most valuable asset a species can acquire; he shares that asset with man—*adaptability*. The wombat is stronger than either the koala or Tasmanian devil—highly specialized animals. The wombat is a happy animal. The Tasmanian devil is as surly as a bear, and as fierce as its name indicates. The koala is only fit for a poetic life in a pure gum forest—the battle of life has sounded on him the doom of early extinction.

“These three marsupials show the whole history of the cecum: The koala with its great development of cecum, the Tasmanian devil with its cecum atrophied out of existence; the wombat with the hall-mark of adaptability, an atrophied cecum, carrying a true vermiform appendix. Whether or not a receding cecum carrying a true vermiform appendix marks the highest in bowel development depends entirely upon what is regarded as the highest development. The cecum and vermiform appendix of the wombat represent a development midway between a supposed cecum which cannot be found in the Tasmanian devil, and the large cecum of the koala. The vermiform appendix

represents possible and probable development in two directions—one toward a larger cecum through coarse food—the other toward annihilation of the cecum through soft concentrated food. By this central position bordering the confines of two extreme specializations, the great boon of adaptability is conferred. This wonderful adaptability has doubtless many times over compensated all the suffering and loss by death brought about by diseases occurring in the appendix. For these diseases, an evolutionary study offers only suggestions of prevention by a return to a simpler and coarser diet than now prevails.”

In a later communication (1923), MacKenzie again calls attention to the relation existing between the development of the large intestine in these marsupials and that which has taken place in the human race. “The human colon,” he tells us, “consists of two divisions only : (1) From the ileo-cecal region to the pyloric region where we have a direct vagal connection, is right, proximal or mesenteric colon. This includes cecum and appendix, ascending colon and hepatic flexure. It is the new or ‘experimental’ colon. (2) From the pyloric region to the mid-sacrum in the pelvis is left, distal or mesocolic colon. This is the old or primitive colon and includes the portions known in man as transverse colon, splenic flexure, descending colon, iliac colon and pelvic colon.”

We have been told that "the wombat"—with his nicely adjusted digestive apparatus—"is a happy animal." But those who are concerned with the ills to which man's equally well adapted digestive apparatus is so frequently subject will bear abundant testimony that man—digestively speaking at any rate—is frequently very far from being a "happy animal." To account for this, it is necessary to consider, not alone the advance of man along the physical lines marked out for him by climatic conditions and alimentary supplies, but also the development of his brain which has enabled him to modify his environment and to alter his dietary conditions, often in ways that experience has proved to be distinctly detrimental to his animal existence. His natural locomotive apparatus, for instance, has been enormously supplemented, not only on land and sea, but in the air and beneath both earth and water, so that he must now be urged to use his legs to preserve his physical fitness. His fields of special sense have been immeasurably extended; audition has been augmented by the telegraph, the telephone and their latest developments, wireless and radio; the telescope and microscope have widened man's range of vision; and photography—especially in its application to roentgenography and cinematography—has levied a tax upon his powers of

sight, for which all the lens-maker's adroitness cannot compensate.

In the same manner, the perfection of culinary art, the endless improvements in the machinery for milling, and the knowledge of the preparation of meat for human consumption, have brought the materials of everyday diet to such a state of refinement that our alimentary tracts no longer receive the necessary amount of exercise, and our organs of excretion—like those of the soon-to-be-extinct koala bear of Australia—are beginning to display a disability to perform the functions for which they were designed.

The dangers of such a situation are fully appreciated by workers in medicine and its allied sciences. Careful studies are continually being made of man's present physical equipment, as well as of its source, its development and its differentiation. The trail has been followed back until it touches the "colloidal slime," the primitive protoplasm of the single cell.

Tracing the *individual* back to his beginning, studying his ontogenetic career, his origin, too, is found to be unicellular—the single cell impregnated within the mother's womb. His phylogenetic career is thus duplicated in miniature. At birth the bag of waters ruptures and the new-born child struggles to exist as a land animal, following

the urge handed down to him by his forebears through the ages.

His nutritional problems are largely a chemical give and take, accomplished through fermental activity down to the single cell of a group, organ or system. Each cell, each organ, each system is an intimate and closely correlated part of the whole, incapable of independent functional activity or existence. Each cell owes its existence to a parent cell, and the metabolism of all cells appears to be regulated by a specialized group of organs. Disturbances in the regulators of metabolism lead to underdevelopment or overdevelopment in cell growth and cell function. These conditions are frequently observable in the individual's general physical make-up, manifested by local or general underdevelopment or overdevelopment, as the case may be.

Animal life is dependent upon vegetable life, and both forms of life would cease to exist if all bacterial life were destroyed. Microörganisms are vital to existence. In our internal chemistry, they are helpful under normal conditions, often harmful when resistance is lowered, or a surface abraded. For example, the pneumococcus and the colon bacillus, commonly benign, may under suitable conditions cause death quite as certainly as the streptococcus.

In many situations, bacteria appear to have

about them a field or zone of ferment-like activity—they split up dead tissues into simpler chemical entities, suitable for plant nutrition, without actual contact or change. They may be likened to mobile enzymes; harmless to their host as long as the tissues of the host are normal, when they may act as helpful scavengers. But let the resistance of the host once be lowered through the operation of the deterrent factors of modern civilization, then the once harmless bacteria are prone to invade, and possibly destroy him.

Even with the ultramicroscope and our highly specialized modern laboratory procedures, many bacterial species still remain unidentified. Great numbers of focal infections still escape recognition, though their toxic effects may lead to such general or local pathologic conditions as defects of vision or of hearing, arrest of mental development, involvement of joints, general physical overdevelopment or underdevelopment, etc.

In my experience, the alimentary canal is the region of infection most frequently overlooked; and the establishment of proper colonic drainage and the clearing of pathogenic bacteria from the bowel have accomplished astonishing results, such as the cure of epilepsy, mental hebetude, arrested mental and physical development, diseased joints, pendulous abdomens, ptosis of abdominal and pelvic organs, and metabolic disorders generally.

In our public schools we examine the children for various infectious diseases, focal infections, hypertrophied tonsils, adenoids, caries of the teeth, defective eyesight, hearing, etc., but we completely ignore their alimentary canals. No doubt many a child has been classed as mentally abnormal or "nervous," when in reality he was simply chronically toxic from infection in the alimentary canal, and needed only proper treatment to restore him to health.

CHAPTER II

INTESTINAL BACTERIA

Bacterial fecal flora of infants—Changes in fecal flora due to the development of the individual and the ingestion of a more varied diet—Growth of putrefactive organisms due to fecal stasis—Production of toxins due to disturbance of function—Cathartics useless unless the cause of the infection be first removed—Predominance of *Bacillus coli*—Other organisms found in the intestinal tract.

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At birth, the meconium, or fetal intestinal content, is practically sterile. It is not until the greater part of a day has elapsed that bacteria begin to appear in the infant's alimentary canal. The conditions surrounding the new-born child are largely influential in determining the number and variety of the organisms which, from that time on, gain access to the digestive tract, by way either of mouth or anus. If the weather is warm, or the environment of the infant is unclean, there will, of course, be a more luxuriant growth than when opposite conditions prevail.

After lactation has been established and the intestinal content of the new arrival is permeated with milk, the number of bacteria in the digestive

canal quickly increases. About the third day after birth, *Bacillus bifidus*—an obligate anaërobe, fermentative in character—can be detected. This bacillus acts upon the lactose and other sugars, forming acid in considerable quantities, but does not give rise to gas. *Bacillus coli* is early found at the ileocecal valve and in the cecum, as well as in the colon. It is noticeable that the intestines of artificially fed infants produce a far greater variety of flora than those of infants who are nourished by the natural method.

Extensive studies on the fecal flora of infants have been made at Johns Hopkins Hospital. Smears (stained by Ford, Blackfan, and Batchelor) from the evacuations of children revealed six different types of organisms: small bacilli both Gram-positive and Gram-negative, Gram-positive micrococci, streptococci and yeast-cells, large Gram-positive bacilli and spores of various sizes and shapes. These investigators examined the dejecta of ten breast-fed babies and of eighteen artificially fed children, varying in ages from one to ten years. These latter were fed on a mixed diet, on cow's milk, raw or boiled, on buttermilk, or on protein milk. Except in rare instances, the Gram-negative bacilli were the most abundant; Gram-positive micrococci and streptococci were found in six of the ten breast-fed babies, and in ten of the eighteen artificially fed children. Yeasts were ob-

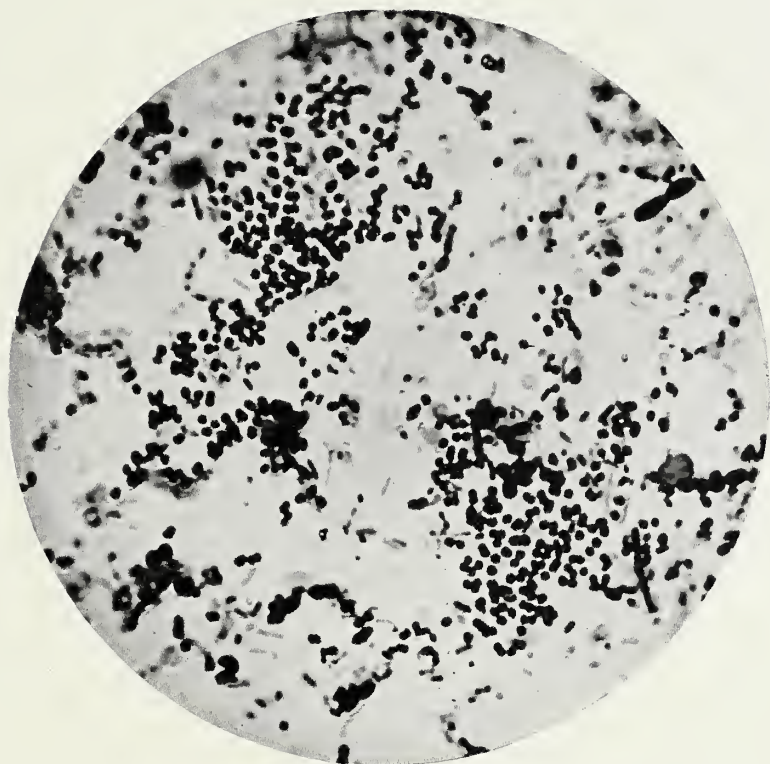


FIG. 1.—Fecal smear (stained by Gram's method); this specimen shows a predominance of staphylococci.

tained in six of these eighteen children, two of the children being on a diet of buttermilk which on culture proved to contain yeasts in great numbers. In three other cases, milk was the chief article of diet and in one instance the child was being nourished on protein milk. In one case, the stool of a six weeks' baby suffering from pyloric stenosis and fed on breast milk, was also full of yeasts. In the dejecta of the breast-fed children, aërobic spore-bearing bacteria were obtained in all but one case. They were present in considerable variety in the original smears, even in the youngest nurslings, evidently finding their way into the alimentary canal of the child as soon as it begins to swallow. It is the opinion of these authors that the presence of aërobic spore-bearing bacteria, Gram-positive in character, in the dejecta of children, is to be attributed to "their mechanical introduction with the richly infected food." This was particularly striking in the cases of children fed on protein milk and buttermilk.⁶

When the individual reaches maturity, the bacterial flora of the large intestine will for the most part be aërobic, liquefying bacilli—both of the sporiferous and of the nonsporiferous types—together with a limited number of anaërobic bacteria. The presence of these organisms is, of course, perfectly normal when they remain in their proper location, but it is important to realize—to quote the expres-

sion of Kendall⁷—that “the normal intestinal organisms are ‘opportunists,’ potentially capable of becoming invasive whenever the barriers which ordinarily suffice to limit their development to the lumen of the alimentary canal become impaired, giving rise to endogenous infections.”

We must remember, also, that the intestine is constantly invaded by foreign organisms from the world outside, and it is their presence which produces changes in what are considered the normal intestinal bacteria and modifies their activities. “Normal intestinal organisms, or types indistinguishable from them by the ordinary methods of study, may multiply with abnormal luxuriance through unusual conditions, extend their habitat, and crowd out some existing organism, eventually leading to abnormal activities in the alimentary canal which may be detrimental to the host.” Thus we see that from infancy to old age the intestine is a battle-ground wherein a never-ceasing struggle goes on between the native population and the foreign invader. Moreover, it is evident that the condition of the flora of the intestine is one of the most important factors that influence health, even determining the duration of life itself.

The lactic acid fermentative processes should be always in control, but if, through faulty diet, carelessness, or impure food supply, the butyric acid ferments and putrefactive organisms become pre-

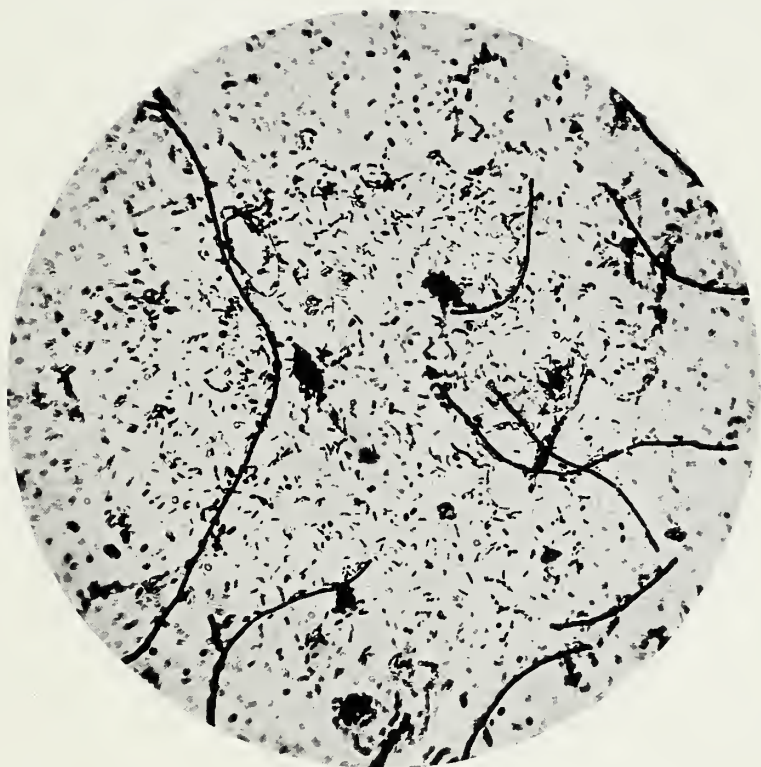


FIG. 2.—Fecal smear (stained by Gram's method); mixed flora, with noticeably prominent thread-form saprophytic organisms of unusual length. Specimen taken from a patient suffering from a large pocket in the transverse colon.

dominant, good health may be replaced by sickness and disease. As a child develops, the difficulty of keeping the proper balance between the good lactic acid fermentative processes and the evil putrefactive ones becomes greater. With the coming of teeth, we have more difficulty in keeping the oral cavity properly cleansed, because of the addition to the diet of meat, eggs, unmodified milk, and other foods which cause still more putrefactive activity in the intestine.

“The alimentary canal, from the viewpoint of bacteriology, is a most efficient incubator and cultural medium combined, in which bacterial growth exceeds in both intensity and complexity that of any known medium. The range of reaction and composition of nutritive substances at different levels of the intestinal tract is such that theoretically a great variety of bacteria capable of developing at body temperature may find conditions favorable for their growth there. The prominent types of bacteria that appear in the intestinal flora of a normal person are fairly constant in their occurrence, but there may be well marked seasonal and even annual variations in the relative proportions of the individual groups of organisms that comprise the flora. This suggests that the normal bacterial flora is acclimatized to the intestinal environmental conditions of temperature, reaction and composition of food, and of intestinal secre-

tions at different levels. It also indicates that the activities of the organisms that comprise the normal intestinal flora are not in active opposition to those of the host. . . . The bacteria of the intestinal flora change along rather definite lines from infancy to adult life, as the diet of the host changes from the monotonous pabulum of infancy to the varied regimen of the adult. The organisms parasitic upon the skin and other surfaces of the body do not exhibit this change in type, and it is reasonable to attribute the relative stability of the skin flora to the relative constancy of the environmental conditions there, while the succession of types of intestinal bacteria from infancy to adult life is rather definitely associated with corresponding changes in the diet of the host.”⁷

However, in the extensive growth of putrefactive organisms, the diet is a secondary factor. It is the retarded movement of the food that gives this flora opportunity to grow within the alimentary canal, and to attack the proteins. The absorption of an increased amount of toxin then follows, which in turn affects the secretory organs and glands.

When there is no lesion in the alimentary canal, a certain amount of putrefactive material passing through it may not produce any active symptoms. The glandular secretions remain normal, and the intestinal waves are strong enough to keep the

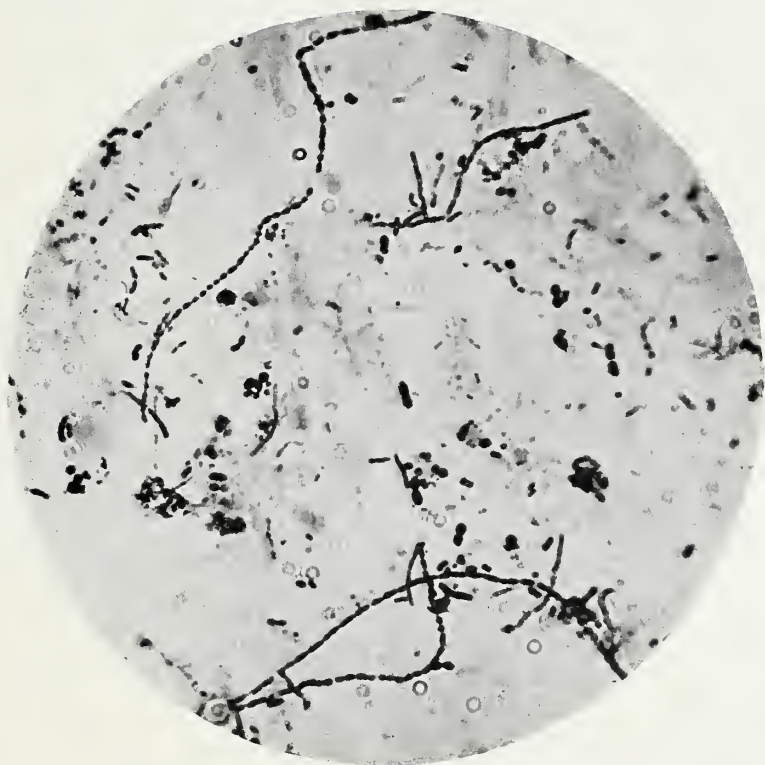


FIG. 3.—Abundant growth of streptococcus in a fecal smear stained by Gram's method.

fecal current moving. This active current is a great factor in health, because the normal flow of the fecal currents has a strong tendency to prevent the colonization of putrefactive microorganisms on the intestinal wall. It is only when there is an anatomic defect in the wall of the intestine, which results in the production of toxins, or when there is a retardation of the feces, that bacteria have an opportunity to colonize. This may take place even when the intestinal flora is very simple, for a large colony of *Bacillus coli*, in conjunction with an obstructed fecal current, is capable of giving rise to marked systemic disturbances.

While bacterial organisms enter the body by many routes, the most frequent avenue of infection is by way of the alimentary canal. Likewise, the greatest part of the elimination of the waste or toxic material which is constantly going on in the organism is by way of the intestine. Therefore, so long as the excretory organs are in good working order, deleterious bacteria are systematically neutralized, or destroyed and eliminated. It is only when there is some disturbance of function that a change in the physiologic chemistry of the digestive tract can take place, with the resultant production of toxins. These toxins are formed by the action of bacteria upon meat fibers and other protein material which have been

arrested in their passage through the intestine. Intestinal stasis from whatever cause—enteroptosis, pockets, constrictions—is always one of the basic causes of such a putrefactive process. It has been pointed out by some recent French writers ⁸ that in simple constipation where the material accumulates in the descending bowel, there is often little appreciable effect upon the subject's general health, many persons seeming to support this type of intestinal stasis without trouble. The difference seems to be in the point of arrest of the bowel content. While in left-sided constipation the material is dry and bacterial life less active, in the right colon we have a more or less liquid condition, because moisture is constantly being added from the small intestine; this keeps up an active focus of infection, resulting in general systemic intoxication.

If alterations occur in the mucous lining of the intestine, the character of the excretion will be greatly modified, showing a preponderance of proteolytic organisms, which inhibit the fermentative bacteria, so that the feces becomes putrid, or fetid, and alkaline in reaction, the iodophilic bacteria almost disappear, and the volatile fatty acids are greatly reduced. Under these conditions, all the digestive products—proteins, fats and carbohydrates—contribute material for the generation of toxins which are capable of markedly lowering

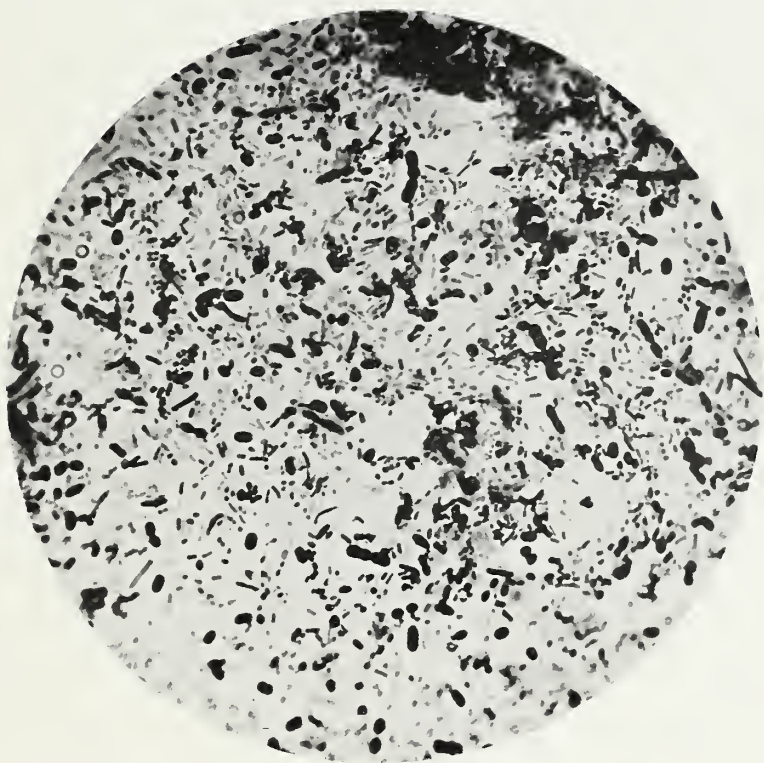


FIG. 4.—Marked predominance of *Bacillus aerogenes capsulatus* among mixed flora, in fecal smear (stained by Gram's method).

general vitality. The effect of these ptomaines upon the nervous system is usually evidenced by the asthenia and nervous depression which these patients so often exhibit. Symptoms of pathologic colonic conditions will appear in the upper part of the alimentary tract; foul breath and coated tongue, coupled with loss of appetite and gastric disturbance, are quickly followed by loss of weight, often very severe. On palpation, the area of tenderness can be readily established, and the distention will sometimes be so marked as to suggest a malignant growth.

In discussing mucous colitis, Stauffer⁹ emphasizes as its two chief causes infection and incomplete elimination. While he is particularly interested in the relation he has observed between an infected lower bowel and mucous colitis with appendicitis, he remarks that under any circumstances, "no amount of dietetic or local medication will have any value until the infection is located and removed. Cathartics add insult to injury, and are mentioned only to be condemned." To eliminate the toxin-producing mechanism, we must first remove the material from which the toxins are being generated, and thereafter so change the chemical conditions as to restore the normal balance.

Only a small part of the excreted bacteria can be found alive in the feces (one per cent according to Strassburger). This is the reason that we

often cannot grow in media, organisms which we recognize in stained fecal smears. The best way to obtain a specimen for bacterial examination is to pass a rectal tube to the point of infection of the colon. The bacteria obtained from the cecum develop the greatest virulence under propagation.

In cases where the growth of *Bacillus coli* is heavy, it is almost impossible to isolate the other organisms which are visible in the stained smears. One reason for this is that *Bacillus coli*, with its short incubation period, rapidly outgrows the more slowly developing organisms. Another is that the processes affecting all the bacteria present in the colon give *Bacillus coli* a numerical advantage even before defecation takes place.

In microscopic stained work on fecal material, the order of predominance of bacteria will usually be found to be: *Bacillus coli*; unclassified organisms including particularly a Gram-positive, unencapsulated diplococcus; Gram-positive bacilli; *Bacillus aërogenes capsulatus* and *Bacillus lactis aërogenes*; varying amounts of infective organisms of the staphylococcus and streptococcus groups; Gram-negative bacilli belonging to groups other than that of *Bacillus coli*; and, lastly, organisms of saprophytic origin.

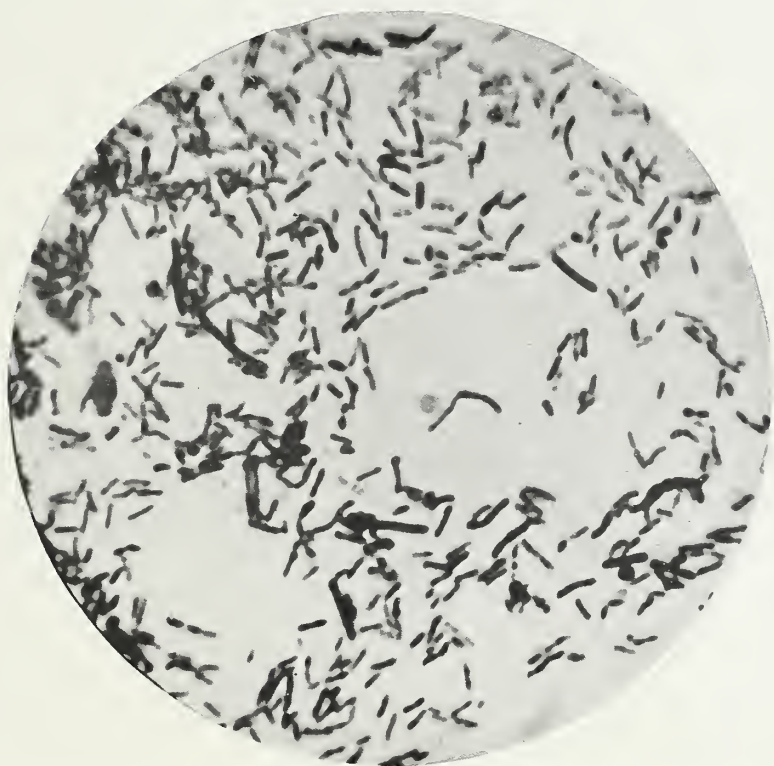


FIG. 5.—Fecal smear (stained by Gram's method). Cultures from this patient showed an almost pure strain of an organism of saprophytic origin. There was noticeable irregularity in taking the stain. This patient had a mammoth cecum, with marked hypotonia.

CHAPTER III

ANATOMY AND PHYSIOLOGY OF THE INTESTINE

Comparative anatomy of the digestive tract—Subdivisions of the intestinal tube—The valvulae conniventes, villi and agminated follicles—Anatomy of the colon—Peristalsis—The mechanics of digestion—Reverse peristalsis—Existence of colonic sacculations makes good drainage essential—Digestibility of vegetable fibers—of milk—The constituents of the feces—Intestinal secretions—Special functions of the cecum.

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The human intestine as it exists at present is the result of development that has taken place in response to extended or differing requirements. In considering the anatomy and physiology of the intestine, it is well to keep in mind the primitive straight tube which was the origin of our more complicated apparatus.

We know that the length, caliber and general construction of the alimentary canal vary considerably in different animals, this variation depending on the nature of the food consumed.

The stomach of the carnivora is very ample and powerful as compared with that of the herbivora,¹⁰ and the intestine of the carnivora is much shorter and smaller in volume than that of the herbivora.

In the cat, for example, the entire length of the intestine is only six or seven feet; while, in striking contrast, the intestine of the horse is about one hundred feet in length, that is, ten to twelve times the length of its body.

In the adult man, the length of the intestine is independent of age, height, or weight; it is longer in vegetarians than in those who eat meat. The small intestine proper varies considerably in length—from fifteen to thirty-one feet. It is attached to the posterior abdominal wall by a fold of peritoneum called the mesentery; and is divided into duodenum, jejunum and ileum. The duodenum is from nine to eleven inches in length; is dilated at its pyloric origin, and firmly attached to the posterior face of the liver by a peritoneal fold. It is also attached to the right of the lumbar region by connective tissue. It describes the arc of a circle, in the concavity of which is lodged the right extremity of the pancreas.

Jejunum is the name usually given to the second division of the small intestine, and *ileum* to that of the third; that is, the section opening into the large intestine. Many anatomists refer to the whole region between the duodenum and the head of the cecum as the *jejuno-ileum*. The duodenum is the most firmly fixed part of the small intestine, the jejunum and the ileum following no definite or constant course, their folds appearing in different

places in normal subjects. The termination of the ileum is at the junction with the cecum in the right iliac fossa, the entrance—as has already been noted—being guarded by the ileocecal valve. The villi and valvulae conniventes are found throughout the jejuno-ileum.¹¹

The recognized subdivisions of the large intestine are the cecum, the colon and the rectum.

In the cat family, the cecum forms only a small, spirally twisted appendix; while in the herbivora, the cecum serves as a reservoir for the enormous quantities of fluid ingested, and for the food while undergoing bacterial decomposition. In man, the cecum, which is located in the right iliac fossa, is directed somewhat obliquely downward and to the left. It commences at the ileocecal valve, varies in length, and terminates by a rounded extremity in a small, hollow prolongation, the *cecal* or *vermiform appendix*.

The human colon, which measures from twenty-five to fifty-four inches in length, begins in the right iliac fossa above Bauhin's valve (*ileocecal valve*); it ascends to the lower face of the liver, passes abruptly across from right to left, and at the spleen takes a downward course to the iliac fossa; it then describes the iliac *S*, in order to reach the mesial line, where it has its continuation in the rectum,—the fixed terminal section of the large intestine. In this course, the colon is divided into

three portions: the *ascending colon*, the *transverse colon*, and the *descending colon*. The muscular coat (tunica muscularis) of the colon consists of an external longitudinal, and an internal circular layer of nonstriped muscular fibers.

The *longitudinal* fibers do not form a continuous layer over the whole surface of the large intestine. In the cecum and colon they are especially collected into three flat longitudinal bands (taenia coli), each about 12 mm. in width; one, the posterior, is placed along the attached border of the intestine; the anterior, the largest, corresponds along the arch of the colon to the attachment of the greater omentum, but is in front in the ascending, descending, and iliac parts of the colon; and in the sigmoid colon the third, or lateral band, is found on the medial side of the ascending and descending parts of the colon, and on the under aspect of the transverse colon. These bands are shorter than the other coats of the intestine, and serve to produce the sacculi which are characteristic of the cecum and colon. In the sigmoid colon the longitudinal fibers become more scattered, and around the rectum they spread out and form a layer, which completely encircles this part of the gut, but is thicker on the anterior and posterior surfaces—where it forms two bands—than on the lateral surfaces (Gray).

Comparing the human colon with that of the

carnivora and of the herbivora, we find that the colon of the cat is scarcely larger than the small intestine, and is neither sacculated nor furnished with longitudinal bands; whereas, the horse's colon is about twenty-three feet long; it is traversed by longitudinal bands, and is sacculated and furrowed transversely for a great part of its extent, these sacculations and furrows beginning in the cecum.

Upon the internal face of the small intestine are a large number of folds or rugae, the *valvulae conniventes*, which enormously increase the area of absorption.

The alimentary canal also possesses secretory elements. Among these are the *villi*—long, finger-like projections which occur on the internal surface of the small intestine, particularly the upper part. These villi vary much in form in different mammals and in different portions of the tract of the same individual. In man the villi are said to be millions in number; the vast majority are conical in shape, the base being slightly broader than the free extremity. In the duodenum, however, they possess a foliate shape, while in the ileum some of the villi are clavate. The villus is formed by a projection of the corium which is covered by the lining epithelium of the intestine. The axis of the villi contains a large lymphatic tube or *lacteal*, which begins in the inner third and proceeds outward through the corium to enter a lymphatic

plexus lying just within the muscularis mucosae. Many of these fibers turn outward and are attached to the basement membrane beneath the epithelium at the sides and tip of the villus. By their rhythmic contraction, the muscle fibers of the villus aid in expelling the contents of the lacteal.

Each villus is supplied with one or more arterioles which enter at the base and pass to the inner third, where they form an abundant capillary plexus about the blind extremity of the lacteal, and in the apex of the villus. Minute venules collect the blood from this plexus and, following the course of the lacteal, make their exit from the base of the villus to join the venous plexus in the deeper part of the mucosa.

The corium of the small intestine, which makes up the substance of the intestinal villi, consists of a fibroreticular stroma which is so infiltrated with leucocytes as to constitute a diffuse lymphoid tissue. In many parts of the mucosa, the lymphoid tissue forms isolated nodules, the *solitary follicles*. Aggregations of these follicles, which often occur, are known as the *agminated follicles*, *agminated glands*, or *Peyer's patches*. The constituent follicles in one of these Peyer's patches number fifteen or twenty, and each nodule is usually covered by a thin, fibrous capsule, but two or more may be confluent. Peyer's patches, numbering

from twenty to twenty-five in all, ordinarily occur in that portion of the intestinal mucosa which is farthest removed from the attachment of the mesentery, being most frequently in the ileum, especially in the neighborhood of the ileocecal valve. They often produce oval areas large enough to be seen with the naked eye.

The long axes of the ovoid nodules exceed the average thickness of the mucous membrane, so that the patch forms a superficial elevation of the mucosa, and its deeper surface penetrates the muscularis mucosae and enters the submucous coat. Hence, occasional fragments of the muscularis mucosae are often observed between the bases of the constituent nodules. Villi are found upon the free surface of the follicles only in the intervals between the constituent nodules. The largest nodules lie near the center of the patch; the smallest appear at its periphery.¹² Solitary follicles occur throughout both the large and the small intestines, while Peyer's patches are found only in the small intestine.

The cecum in both man and the lower animals is lined by a plicated and very follicular mucous membrane; in the cat family, the cecum shows at the bottom of the cul-de-sac a true Peyer's gland.

The ileocecal valve consists of two folds of mucous membrane with muscle fibers between the layers. These folds lie at the end of the ileum,

where it opens into the colon, and project toward each other across the lumen, so that only a slit-like passage remains open.

The colon begins at the ileocecal valve. The first part, or ascending colon, passes upward in the right lumbar region. After making a bend under the liver—the right colic flexure (or hepatic flexure)—it becomes the 'transverse colon, which passes straight across the abdomen in front of the small intestine. Another bend occurs under the spleen, the left colic flexure (or splenic flexure); thence the descending colon passes downward in the left lumbar region to the left iliac fossa. Here it makes an S-shaped or *sigmoid* bend, which is called the *sigmoid colon*. Then, as it enters the pelvis, it becomes the rectum.

The rectum is from five to seven inches long, very distensible, and receives its name from the Latin *rectus* (straight) because, unlike the other portions of the large intestine, it has no convolutions, but simply follows the curve of the pelvic wall, lying in front of the sacrum and coccyx. In the last inch and a half it bends backward (perineal flexure) to pass the tip of the coccyx. This is the anal canal, ending in the external opening called the anus.¹³

The rectum is sacculated, usually presenting, when distended, three dilatations, of which the lowest and largest, called the *ampulla*, may meas-

ure nine inches or more in circumference. The sacculæ are separated by deep creases, passing about two-thirds around the intestine, the so-called "valves of the rectum."¹⁴

The basic factors upon which the movements of our alimentary canal depend are the peristaltic waves and their gradients.

Peristalsis is the name given to the peculiar motion of the stomach and intestine during the passage of their contents. The circular fibers compress the food and at the same time the longitudinal fibers shorten the tube. This action goes on from above downward, causing a sort of worm-like movement which is described as *peristalsis*, or peristaltic movement. The peristaltic action of the bowel is made more effective by the presence of a reasonable amount of material upon which it can act. This explains why a certain amount of so-called "rough foods" should always be ingested and why restricting the diet to material carefully refined and prepared beforehand leads to many digestive ills.

Alvarez¹⁵ has clearly established that the digestive tract is highly autonomous and that the mechanism which produces peristalsis is found in the wall of the intestine. These waves, together with the process of digestion and absorption, begin in the mouth and end at the anus. In the course of this mechanical motor process, the conveyed

material has its points of relay and undergoes certain endocrine chemical changes. Therefore, in order to follow this process intelligently, we should know the points throughout the entire length of the tube at which absorption of different food substances takes place. It is upon this principle of absorption that many drugs are administered.

There is no doubt that the waves of the ileum stimulate the cecum, but the terminal ileum is not alone the receptacle of the ileum residue, which undergoes a change upon entering the cecum, but is, moreover, a terminal point of the stomach waves which also undergo a change at this point, and are largely instrumental in producing the churning movements of the cecum. It is, however, the traction muscles which are the most powerful aid in advancing mass movements of the residue traversing the colon. In the cat, because the stomach is very powerful and the intestine very short, the stomach waves are sufficient to carry to the rectum the small amount of residue resulting from this animal's high protein meat diet, and, therefore, no traction bands for contracting the colon are required. In the horse, however, as the stomach waves are comparatively weak, they are unable to move the enormous amount of residue accumulated in the long colon; therefore, the bands of the traction muscles are necessary to exert traction by a contracting movement. In man, it is illogical to

believe the stomach contractions powerful enough—considering gradients—to produce waves sufficiently strong to empty the colon, without the intervention of other forces.

It is my experience that the traction muscles of the colon have a most important function. The longitudinal layer of muscular tissue is arranged much like a tape from the cecum to the sigmoid flexure. The function of these muscle fibers is to relax and shorten the intestine and to contract it to within three-quarters of its relaxed length, thus raising the cecum as high as the hepatic flexure. Therefore, we must deal with the colon, not by considering each section separately, but by regarding it as an organ similar to the stomach, having three major divisions, but powerful enough to empty its entire length down to the sigmoid by one convulsive contraction.

The nerves which control the colon form a part of the pelvic plexus which supplies the various abdominal viscera. This pelvic plexus is in turn part of the sympathetic nervous system, which has its connection with the spinal nerves by means of what are known as *rami communicantes*. The nerve supply of the rectum is more abundant than that of the colon. In addition to the slow laborious peristaltic movements of the colon, so thoroughly described by many authors, it has likewise the

power of traction from below. This will be further discussed in connection with fecal stasis.

More than a quarter of a century ago, Jacobi¹⁶ observed that the intestine possesses not only the propulsive power which we call peristalsis, but a reverse movement or antiperistalsis, an impulse occurring at regular intervals whenever the cecum has a fluid content. Cannon¹⁷ later made a special study of this reverse peristalsis as it occurs in cats and, more recently, extensive x-ray observations have been made by Case¹⁸ upon human subjects. These rhythmic reverse movements are interrupted at regular intervals by a downward peristalsis, but it is the action of the ileocecal valve alone which keeps the contents of the cecum from being forced backward into the small intestine every time reverse peristalsis takes place. In the intervals between the backward waves, however, the valve relaxes so that some of the intestinal content is able to pass into the cecum. This action appears to be largely instrumental in churning up the liquid material and spreading it over the surface of the cecum and ascending colon, thus favoring absorption of fluid and the shaping and drying of the residue which is being passed downward through the intestine.

In addition to peristalsis both downward and reverse, the carbonic acid and other gases which are generated in the digestive tract through the

action of bacterial ferments upon starch, cellulose and similar materials, play the part of a powerful stimulus to the muscular activities of the colon.

In the normal cecum, these gases produce a constant distention and contraction of the organ which continues throughout the entire length of the colon. In its true physiologic state, the colon's entire length is characterized by slight depressions or pockets into which the intestinal contents are pressed by peristaltic action and the force of the gases present in the intestine, so that fluid is constantly absorbed from the mass, and its consistency continually changes as it advances through the colon. A comprehension of these facts makes it easy to understand why the maintenance of good drainage of the entire alimentary tract is so essential to health and proper metabolism. Given the constant presence of fermentative and putrefactive bacteria, the action of peristalsis, and the structure of the colonic tube, anything which interferes—even to a minute degree—with the regular expulsion of the waste products of the digestive process is practically certain to have grave results.

Comparing the human digestive apparatus to that of the lower animals, it will be observed that our stomachs readily digest meat and other foods of high protein content, but that fruit fibers, such as those of prunes, grape-fruit, and oranges, or vegetable residue, such as that of celery, asparagus

fiber, and spinach in particular, are not acted upon so thoroughly. I find that spinach is rarely, if ever, digested, and in most cases it will be found in the colon in great wads showing a markedly acid reaction. It is stated by a French writer that the human system is only capable of absorbing $\frac{1}{62}$ grain of iron, and as this amount is contained in a single teaspoonful of spinach, it may be concluded from this that a teaspoonful of spinach is a sufficient addition to our diet. Lettuce leaves a small residue in the form of soft fiber; tomatoes are readily digested except that the skins are occasionally passed unchanged, but mushrooms are always found in the stool wholly unaffected by the digestive processes.

Kellogg says of milk, "Within the last few years much evidence has accumulated to the effect that cow's milk is by no means the specially wholesome human nutriment that it was once supposed to be. Bunge, a great physiologist, and perhaps one of the world's highest authorities on foods, goes so far, indeed, as to assert that many thousands of children are annually killed by feeding on cow's milk; and many persons have learned from their own observation that milk does not agree with them. Cow's milk is excellent food for calves, to which it is naturally adapted, but for many human adults it appears to behave almost as a poison. The probable cause is the very common inability

to digest the casein of cow's milk. Personal observation in a very large number of cases has convinced the writer that at least one-third, and probably more than one-half, of the persons suffering from chronic disease cannot use cow's milk freely without more or less serious injury. One of the prominent symptoms arising from the use of cow's milk is the production of a condition commonly known as 'biliousness.' The tongue becomes coated, there is a bad taste in the mouth, the breath is foul, the bowels are inactive, and an examination of the stools shows the presence of considerable quantities of undigested casein undergoing putrefaction.

"The free use of milk is unknown among savages. The writer has no doubt that the extensive use of milk, under the mistaken notion that it is a specially valuable food for adults as well as for infants, is one of the active causes of the steady increase of constipation amongst civilized people. Putrefaction of undigested casein in the colon produces an alkaline condition which paralyzes the bowel and encourages conditions by which the defecating mechanism is in various ways more or less irreparably damaged." ¹⁹

Some of the most difficult impactions of the colon that I have been called upon to remove have been the result of a milk diet. On one occasion it was necessary to use twenty-six gallons of solution

to remove such an impaction. This impaction, added to the irrigating fluid, produced a heavy whitish return of very offensive odor; and the total quantity of feces and water measured twenty-seven gallons. A certain amount of fluid was absorbed and this was not accounted for in these calculations.²⁰

As we have accustomed ourselves to selected foods of highly protein content made soft by culinary preparation, our digestive tracts no longer possess the qualities necessary to digest roughage. The reason that we still have comparatively large colons is not from the quality of the food which we ingest; it is because of the quantity, the result of overstimulation of the palate, which must eventually produce definite changes in the human alimentary canal. To take care of the food man ordinarily attempts to consume he would require the stomach of a wildcat and the intestines of a horse.

When we do not overeat, the undigested food or residue forms but a small portion of our feces, the chief bulk being made up of secretions or excretions of the intestinal canal with the addition of bacteria. Cammidge has described the usual constituents of the feces as follows:

1. Remnants of the food that have escaped absorption.
2. Remnants of the food which are relatively or entirely indigestible.

3. The secretions of the intestinal mucous membrane and of the digestive glands.
4. Cell elements and, under pathologic conditions especially, mucus, serum, red blood-corpuscles and leukocytes.
5. The products of the splitting up of the foodstuffs, some due to the effects of ferments, others arising from the action of the bacteria.
6. Excretory products of the intestinal mucous membrane, such as salts of calcium, iron and possibly other metals, etc.
7. The bacterial flora of the intestine.
8. Adventitious additions to the stools, such as intestinal parasites or their eggs, enteroliths, gall-stones, etc.

This applies to the feces of infants and children, as well as to adults, although the relative proportions of the individual ingredients are necessarily different at different ages and under varying conditions, the most noteworthy contrast existing between the stools during the first few months and in later life.

“A careful estimation of the daily average amount of the feces passed, when compared with the standard figures for successive periods of life and for different dietaries, affords a very useful indication of the way in which the alimentary canal is performing its functions. This is true for the infant before weaning, for older children, and also for adults, if the differences that result from diets consisting of breast milk, cow’s milk, and various types of solid food, etc., are borne in mind.

“The digestive functions of the stomach influence the bulk of the feces very little, even complete

achylia gastrica causing scarcely any modification. Failure of the digestive secretions of the intestine giving rise to an increased proportion of undigested fat or albumin in the stools is among the commonest causes of an increase in their bulk. . . . The amount may also be increased by admixture with pathological products coming from the intestinal wall or elsewhere, such as mucus, blood, pus, serum, etc. . . . Conditions favoring abnormal putrefactive or fermentative changes in the intestinal contents may increase the bulk of the feces by causing proliferation of the bacteria.

“Adults and children taking a solid mixed diet have, as a rule, one or two motions of the bowels daily, but even under physiological conditions the number is subject to wide variations. . . . Psychological, general, and reflex nervous influences have an important bearing on the frequency with which the bowels are opened . . . the time spent by the food in the intestines bears no particular relationship to the frequency of the evacuations. . . . The time of passage of the food through the alimentary canal is much less in infants than in adults—usually from one-third to one-quarter. It is probably owing to this rapid passage that certain phenomena, such as reduction and putrefaction, do not occur in infants with the same intensity as in older people.

“In health, the form and consistency of the feces

is mainly determined by the quantity of water they contain, and is hence largely dependent upon the nature of the ingesta. With a mixed diet they exhibit a characteristic cylindrical form and are of fairly firm consistency. . . . Abnormally soft motions occur when there is an excess of fluid, fat or mucus, and when a large amount of vegetable material is taken . . . the formation of gas, and the irritating action of the bacterial products are much more pronounced with certain foods than with others.”²¹

In the carnivora (cat), the stomach secretes a gastric fluid throughout the whole extent of its mucous membrane. In the horse, the action of the stomach is insignificant as compared to that of the enormous colon, which is capable of digesting and absorbing large quantities of food and water.

The intestinal secretions have been extensively studied without arriving at definite conclusions as to their exact ingredients. A true physiologic, secretory process is carried on by the fluids of the intestinal villi and their numerous glands, acting upon the food consumed.

Secretion of intestinal fluids can be stimulated by the action of certain chemicals upon the glands of the intestine. Mechanical stimulation of the alimentary canal results from the chewing and swallowing of food, or sometimes from the use of instruments. The small intestine with its equip-

ment of millions of villi fistulae is capable of secreting and absorbing a variety of substances, while the colon with fewer villi digests and absorbs much less, the greater part of the absorption in the large intestine being accomplished by the cecum. This part of the digestive tube harbors the greatest quantity of living bacteria, some of which aid digestion, while others produce an active putrefaction.

As the cecum has both a chemical and a mechanical function, even if it is not of great value to the body as a whole, its presence in the alimentary canal is indispensable. The disturbances suffered from an overloaded cecum are similar to those resulting from an overloaded stomach. A sensation of fulness in the abdomen is often produced by regurgitation or "backfire" of the gases and residue forced through the ileocecal valve into the ileum.

CHAPTER IV

THE RELATION OF COLONIC PATHOLOGY TO SYSTEMIC INFECTION

Chemical changes induced by disease—The theory of focal infection—The endocrine glands—"Errors of metabolism"—Infective foci not always located in the head—Stokes on causes of colitis—Abolition of colonic stasis must precede any form of therapy—Health and proper function dependent upon elimination of toxic products—Autonomy of the gastrointestinal tract—Purpose of colonic irrigation the establishment of thorough drainage—Inefficacy of catharsis—The colon a neglected and despised organ, but capable of "reformation"—Intestinal interlining adhesions—Case on pathology of the colon—Diverticula—Their occurrence in the obese—Symptoms of pathologic lesions.

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Our knowledge of the alimentary canal and the endocrine chemistry of the normal human subject is limited enough. But when disease has affected the anatomical structure of the digestive tube and has interfered with the endocrine secretions and intestinal juices, varying chemical changes occur which make it almost impossible to arrive at any classification. It will be readily appreciated how difficult would be any attempt to analyze the intestinal secretions and to compare their constitu-

ents with those of the blood or urine. Nevertheless, I have been prompted to attempt the analysis of intestinal secretions, intestinal gases, the gases and exudates expelled by the lungs, the excretions of the skin, and also an analysis of the urine and blood. From so complete an investigation we ought to obtain data that would enable us to arrive at a more definite conclusion in regard to our body chemistry and its alterations.

The most important factor is the chemical change that takes place during disease; but, in order to recognize the changed conditions, we must first know the mechanism, and be thoroughly familiar, not alone with the chemistry of the body, but its excretions also, as there is no doubt that the retardation of bodily excretions is the greatest obstacle in combating disease. When disease conditions confront us, the metabolic output is of far more importance than the metabolic intake.

During the past ten years the question of foci of infection as a cause of systemic disease has been widely considered and very thoroughly studied and discussed. Especially has the subject of foci of infection located in the head been investigated from every conceivable standpoint, anatomical, pathologic, surgical and—one almost ventures to say—*financial*. In fact, it seems that every known disease has been attributed to some form of focal sepsis.

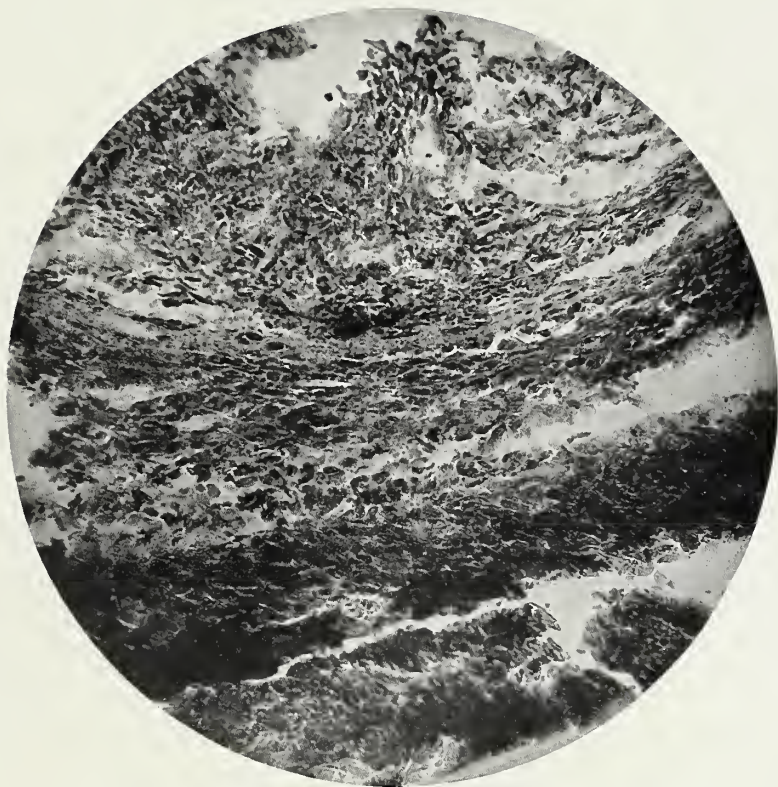


FIG. 6.—Section of intestinal interlining adhesion, removed from the transverse colon through a rectal tube. *Macroscopic examination* showed about 120 c.c. light brown feces, containing strips of smooth, soft, grayish material, varying in length from 1 to 6 cm., about 2 cm. in depth, and having an average width of about 1 cm. *Microscopically*, without staining, strips of fibrin enmeshing red blood-cells and desquamated epithelium were visible. On section, irregular strips of fibrin were seen, with necrotic debris, containing red blood-cells and desquamated epithelium.

Very recently, the attention of the medical profession has been centered upon the part played in the mechanism and function of the human body, by the endocrine glands, and errors in metabolism have been held responsible for all human ills. That the practice of medicine is not entirely free from fads can hardly be denied; yet a thoughtful consideration will easily convince us that the putting forward of these different causative factors of disease is but a constant march along the line of progress, and that the theories of focal infection and errors in metabolism, far from being contradictory, serve to confirm and strengthen each other, so that each but demonstrates the soundness of the premise on which the other is based.

Intensive study of the endocrine system has called attention to the fact that foci of infection are not necessarily or by any means invariably located in the head. While this fact has been well understood, it has not seldom been entirely neglected, and the very areas from which infection is being disseminated have been regarded as being themselves infected by some unlocated focus situated in the head. The occurrence of a cholecystitis or a prostatitis has been attributed to bad teeth or diseased tonsils, when in reality it was exactly the other way about, the actual focus from which the toxins were being generated lying in the digestive or genital tract, and the oral or tonsillar conditions

being but a reflex result of this systemic infection. That colonic stasis has been proved responsible for many focal infections and endocrine disturbances admits of no contention.

At a recent meeting of the American Electro-Therapeutic Association, Charles F. Stokes took occasion to remark, during a discussion on colitis, that in many of these cases the endocrine system is depleted, and the general metabolism suffers in consequence. Because the conditions existing in the colon are so frequently overlooked, many futile efforts are made to treat these local and general evidences of endocrine imbalance. Almost everyone, nowadays, searches for focal infection along the avenue of "metabolic intake"—the nasopharynx, the sinuses, the mouth, teeth, tonsils, and respiratory tract; but the avenue of metabolic outlet—the colon, and the genito-urinary canal—receive only scant consideration. Especially is this the fact when there is a psychic element involved, a frequent occurrence in all cases of endocrine dysfunction. In Dr. Stokes' opinion, the biologic approach seems to give us the clearest understanding of these problems, inasmuch as it brings home the conviction that it is erroneous to consider these lesions as of purely local significance. He believes that drainage and the correction of the pathologic conditions in the colon can, in the majority of cases, be accomplished by the technic here considered.



FIG. 7.—Membranous mass removed from a diverticulum, showing a heavy growth of staphylococcus, from a case of coloptosis with large dilated cecum. This patient had suffered for ten years from dermatitis herpetiformis of the entire body, all evidences of which disappeared after three months' treatment of the colon.

To quote Dr. Stokes' own words: "The patients are given a general overhauling, their hygiene is investigated and corrected, if possible. . . . Many show evidence of endocrine imbalance, others are mildly toxic, and frequently the colon is at fault. These cases are referred to Schellberg for cecal irrigation and the establishment of proper drainage in the digestive tract." ²²

Since 1918, Dr. Stokes has given special attention to endocrine depletion due to influenza as affecting the suprarenal and pituitary glands.

By thoroughly cleansing the entire length of the colon with large quantities of medicated fluid which are quickly absorbed into the blood stream, the secretory organs, the liver in particular, are flooded, and the kidneys thoroughly washed out, the entire blood stream being in this way freed of its impurities. No matter what form of medication or other therapy be employed with the intention of combating the conditions which have arisen because of the infection due to colonic stasis, until the local conditions in the intestines have been corrected, all such efforts can be, at best, but partially effective, and usually they will fail completely. In many instances the removal of the infective focus will be followed by immediate disappearance of the remote symptoms, making any future treatment wholly unnecessary. Not only is the establishment of proper systemic drainage valuable in

cases of manifest disease, but careful attention to this matter will always greatly raise the health standard, even of those who do not look upon themselves as sick, and in considering preventive medicine, it is certainly fully as important to make a careful study of colonic conditions as it is to examine the state of the teeth. Upon proper elimination of waste and toxic products depend the health and correct function of every gland and organ in the body.

Of the many methods employed to restore normal intestinal activity and function, none has proved so satisfactory and effectual as colonic irrigation. The introduction of a warm (50° C.) solution into the bowel "hastens the rate of rhythmic contraction," as has been shown by Magnus, Taylor and Alvarez;²³ and it has been my experience that it not only stimulates active downward peristalsis in the entire colon, but that in some patients even the waves of the ileum are made stronger. Concerning this peristaltic action Alvarez says: "The gastrointestinal tract is largely autonomous, that is, it carries within itself the mechanism essential to peristalsis. This point cannot be emphasized too strongly, because it seems to me that the failure to grasp it is the greatest stumbling-block to further advance in our understanding of the subject. It is undoubtedly true that the extrinsic nerves have much to do with peristalsis, but it is



FIG. 8.—Intestinal interlining adhesion. Specimen, which shows decomposition, removed from an angulation of the sigmoid, following clean-up treatment and implantation of *Bacillus acidophilus* and *Bacillus bulgaricus*. Intestinal flora represented (in order of predominance) are staphylococcus, streptococcus and *Bacillus coli*.

very helpful in simplifying our problems to recognize that the tract can get along without any outside help or interference. This should make us the more willing and eager to study the all-important local mechanisms.”¹⁵

To put this “local mechanism” in proper working order and to keep it so, without the interference of outside agents in the form of drugs, is the aim of proper colonic irrigation. Heretofore it was commonly supposed that a sufficiently heavy catharsis would effectually clear out the intestinal canal, but I have repeatedly demonstrated the fallacy of such a conception. After the administration of four ounces of castor oil—the patient being on “starvation diet” during these experiments—and the administration of a compound cathartic pill nightly, large quantities of residue have been removed daily by successive, colonic irrigations; and even after the lapse of eight days, when the patient had taken one and a half ounces of castor oil, with three compound cathartic pills, followed by six ounces of citrate of magnesia, colonic irrigation brought away more residue than had been evacuated following the initial dose of castor oil. Where colonic stasis exists it is evident that catharsis is wholly inadequate to establish or maintain efficient drainage.

The idea that the taking of cathartics or enemas is likely to induce the formation of a habit is not

consistent but it is well established that they may be injurious, depending upon the drug ingested, or the method of taking the enema. The steady use of Epsom salts, or related substances, produces inflammatory conditions. The action begins in the stomach, causing a violent stimulation of the ileum whereby a large amount of fluid is hastened through the colon by an active functioning of the cecum. No active peristaltic action of the colon is produced, however, and the liquid is quickly expelled by the rectum because of its active distention by the fluid. But when it is desired to produce this action, as in certain acute conditions, the use of Epsom salts may be justified.

Any interference with colonic drainage will lead to intestinal disturbances of some kind, so that it is obvious that the maintenance of proper drainage is a matter of the very first importance. As bacteria colonize in the colon much as they do on an agar plate, any putrefactive focus of bacterial infection may be a determining factor in the production of systemic ailments.

The belief that cathartics drain the system is wholly erroneous. The fluid is hastened through the alimentary canal before absorption can take place and the body is thus robbed of necessary fluids. Therefore, following the use of cathartics we find urine of high specific gravity, and voided in reduced quantity. This condition may be offset

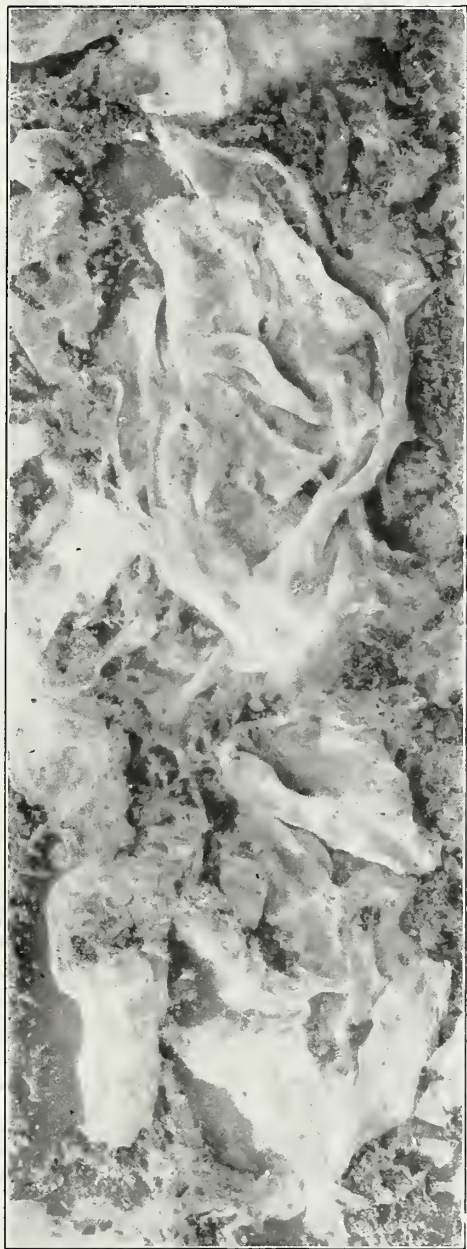


FIG. 9.—Membrane and feces removed from a large pocket in the transverse colon after antiseptic treatment and the application of ichthyol.

by irrigations of the colon in connection with cathartics, as following irrigations a great amount of fluid is absorbed by this organ. This augments the volume of the urine, and immediately after irrigation the fulness of the pulse will indicate the increase of fluid in the circulation.

There is probably no part of the body which requires more care and attention than the colon; and it is equally probable that no other part of the body has been so uniformly neglected. More than that, very eminent authorities, the most conspicuous perhaps being Sir Arbuthnot Lane, have declared that the colon is superfluous, an outgrown organ existing only to give trouble; the utter extirpation of which can only result in benefit to him who loses it.

There remain, however, some who, having given considerable attention to the matter, still believe that the colon may be "reformed," and with proper care and treatment returned to its original condition of harmlessness and efficiency. Although many diseases undoubtedly have their origin in the colon, this does not argue that it is a superfluous organ, but rather that we have misused and neglected it, overlooking entirely its great importance in the human economy. The generation of bacterial poisons in the digestive tract, and their absorption into the blood stream or the genito-urinary system give rise to a long train of ills.

If we can devise a means of emptying out this bacterial incubator, and keeping it thereafter free from infection, we shall have gone a long way toward "reforming" the colon.

Certain putrefactive microorganisms cause an exudate upon the intestinal wall, forming what I have termed *intestinal interlining adhesions*. The matrix of some of these adhesions is made up of fibrin, in which numerous small round cells can be observed together with a few polynuclears, which, when stained, are frequently found to contain streptococci and staphylococci in almost pure culture. These adhesions can also be produced by other infectious bacteria in a great variety of combinations, displaying a more or less pronounced matrix; in the more pronounced forms strips of fibrin enmeshing red blood-cells and desquamated epithelium are to be seen. In the formation of abdominal adhesions the peritoneal and intestinal fluids consist of both exudate and transudate, solidifying as a protective element, on the inner, as well as on the outer wall of the lumen, an inflammatory process being the causative factor. This fluid is rich in proteins which invite the growth of cells and fibrin. Thus, living elements are produced out of parts previously destitute of shape.

Descriptions of these bowel casts are not commonly found in literature, so the following excerpt

from P. J. Cammidge's *Faeces of Children and Adults* is of interest in this connection:

“*Casts of the Bowel.*—More or less complete casts of the bowel are sometimes passed. These usually consist of mucus, but occasionally are ‘diphtheritic’ membranes. The former may be mere shreds of mucin-like material or cylindrical masses, varying in length from 1 or 2 in. up to 8 or 10 ft. and of different degrees of density. Even in children, casts 18 or 20 in. long are sometimes met with. Such casts usually have a constant diameter throughout their entire length. They are generally grey in color, but may be translucent or even transparent. On their free surface they are seen to be studded with fine white granules, and when associated with an acute inflammatory process, may be studded with blood. They are frequently passed with severe tenesmus, without any associated faecal material. Mucus casts are met with in both acute and chronic inflammations of the mucosa of the large intestine, the intensity of the lesion being indicated by the number of entangled epithelial cells. The long, thin tubular, or tape-like membranes passed in muco-membranous colitis have been ascribed to absorption of water and the astringent action of the faeces on the mucus which accumulates round them when they are retained for several days; but more probably they arise from the action of a spe-

cial mucus-coagulating ferment secreted by the mucous membrane. Casts which do not present a membranous formation until they have been carefully suspended in water may also be passed with a good deal of tensemus and the absence of faecal material in mucous colitis, and are not uncommon in gastroptosis and in enteroptosis.”²¹

Generally, in slight intestinal perforations where there is a focus of infection within the intestine, adhesions are likely to be produced. Naturally, we should assume that the production of intestinal and peritoneal fluids is a part of nature's process of checking general leakage from the lumen, acting in a manner similar to clot-formations in leakage of the blood-vessels. Extensive intestinal adhesions are found in cases of pericolicitis.

Ordinarily, we encounter extensive adhesions in the vicinity of the cecum, the hepatic and splenic flexures and the pelvic loop. It is also at these points that drainage is most likely to be obstructed. However, to attempt to classify the nondrainable points of the colon would be a difficult task, as adhesions in one part of the colon, aided by angulations or chronic spasms due to foci of infection, may distort this organ into all sorts of shapes, producing pockets of various dimensions, as well as constrictions which may cause serious strangulations. Case,²⁴ who has done extensive x-ray work

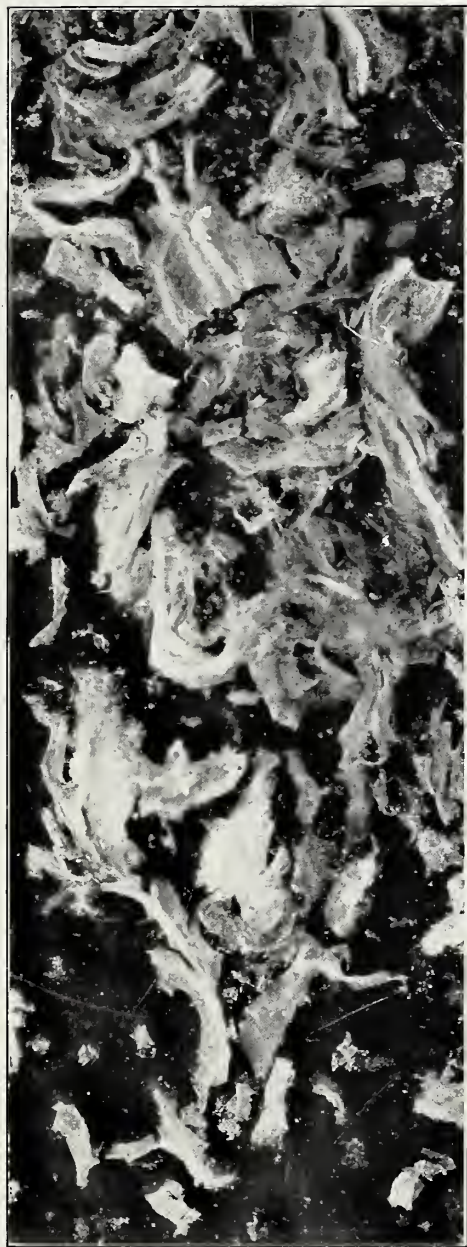


FIG. 10.—Specimen from the same case as Fig. 9, following the fourth implantation of *Bacillus acidophilus* and *Bacillus bulgaricus*. Note the breaking down of the membrane.

on colon abnormalities and diseases, is authority for the statement that one may deduce from the work of Eastman, Hertzler and Jackson—in particular the latter—the fact, that even when we are able to elicit no history pointing to the existence of any previous intestinal inflammation it is possible for extensive colonic adhesions to exist as a result of chronic intestinal stasis. He adds also that “patients with colonic adhesions are much to be pitied because the adhesions are often not recognized.”

Any increase of pressure within the bowel, any weakening of the muscular tone of the wall as a whole, in fact, whatever causes may act to weaken the wall at any point, will offer opportunity for hernial protrusion, and give rise to diverticula or sacculi. Given a series of pockets resulting from relative weakness of the bowel wall and containing fecal material and possibly foreign bodies, we can quite easily predict the various lines of pathologic development which these diverticula will be likely to follow. There are two aspects to be reckoned with, the mechanical factor and the pathologic or toxic element. Any fecal mass not periodically expelled will tend to inspissate, and will likewise become a nidus for bacterial flora of varying sepsis and virulence, and this, combined with the mechanical rotation of the concretions, will almost invariably bring about some sort of inflammatory

reaction. So we might expect to find fibrous hyperplasia with the usual result, contraction of newly formed tissue. If the organisms present are very virulent we are likely to get an acute inflammation, or ulcerations, and even gangrene may occur. In milder cases we should be likely to find ulcerations resulting in chronic local abscess formation, a process of which adhesions are an invariable sequel.²⁵

Incomplete and infrequent evacuations of the bowel may be caused by diverticula or an increase in the size of the normal sacculi of the colon. If these sacs are deep enough, feces may accumulate in them and their passage be seriously delayed or altogether prevented. A state of chronic costiveness may result from the collection of a large amount of residue in such a cul-de-sac, for peristalsis will be very greatly impeded, and even obstruction produced, while the entire bowel may be dragged downward, resulting in enteroptosis and angulations, or even producing enterospasms. All this will increase obstacles in the passage of the fecal current through the affected part of the bowel. If these pockets are large and narrow the action is much like that of adhesions in the form of bands so that they may cause obstruction by direct pressure upon the intestine, or a greater or less degree of strangulation. Hernia of the mucosa may form in different parts of the bowel by



FIG. 11.—Intestinal interlining adhesions which caused a partial constriction in the splenic flexure of a patient suffering from coloptosis. This specimen was removed, following the application of antiseptic solutions and four implantations of *Bacillus acidophilus* and *Bacillus bulgaricus*.

the giving way of the mucosa coat, thus diminishing the walls' propulsive power and favoring impactions, until a decided bulging will take place at the affected spot. These sacculi are most often found in the sections of the colon where there is likely to be sagging, as in the cecum, the transverse colon and the sigmoid flexure.²⁶

The victims of diverticula are often—in fact usually—obese, because in such patients there is apt to be excessive development of the *appendices epiploicae*, and also of fat under the serous coat of the intestine which diminishes the resistance of the wall to any extra pressure which may happen to be exerted. These pockets are for the same reason much less frequent in young subjects.²⁷

According to Pfahler,²⁸ constrictions of the colon are most likely to be found at the hepatic, splenic and sigmoid flexures, but they may occur anywhere. Carcinoma is especially apt to be located at the sigmoid flexure, in the cecum and in the rectum, and when present is usually limited in the early stage to a comparatively small area. The initial symptoms of carcinoma are often overlooked. In the absence of hemorrhoids or benign rectal lesions the passage of a slight amount of bloody mucus should always be regarded as a danger signal. When there is any suspicion of malignancy, all measures to clean the bowel should be pursued with the utmost caution, and the exact

condition be previously made as clear as possible by x-ray examination.

While I do not wish to deprecate the value of roentgenographs of the colon, they not infrequently remind me of the silhouettes which antedated the era of photography. While an x-ray of the colon filled by a barium meal gives the outline and anatomical position of the organ, it shows none of the defects due to the presence of gas and feces, so that such an outline is less exact than the clear-cut delineation of the old-time silhouette.

Disease may exist in the colon and yet remain unrevealed by fluoroscope or roentgenograph. The x-ray photograph of the colon filled with a barium meal does not give a comprehensive picture of the state of the colon, for it is possible for a diverticulum to exist on the side opposite to that facing the roentgenographer, though all that would appear in the roentgenograph would be a smooth black surface like the silhouette. A silhouette profile gives no intimation that its subject possesses ears.

CHAPTER V

THE FUTILE ENEMA

Establishment of free colonic drainage necessary to health—Effects of intra-abdominal pressure—Futility of the enema as usually administered—Hot solutions wholly ineffective without preliminary emptying of the colon—Effect of method of irrigation without special apparatus—Proper irrigative treatment does not produce shock, but stimulation—Consistent, continued irrigation only is effective—Roentgenologic diagnosis of diseased conditions that have been effectually relieved by properly applied irrigation.

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Any attempt to clear out the lower part of the digestive canal must presuppose a complete knowledge of the anatomy, physiology, and pathology, not only of the parts which are directly involved, but also of the entire abdominal region; and, in addition to this knowledge, one must also be possessed of a thorough comprehension of the chemical reaction of any solution or therapeutic measure to be employed. Even when all this has been fully acquired, it is still necessary to master the operative technic and to become possessed of a skill and manual dexterity which only results from long and varied experience. It is my purpose here to de-

scribe a technic for colon irrigation designed to meet the needs I have outlined in the foregoing chapters, and to explain the steps by which the colon—even when badly diseased—may be restored to normal function and vigor. For the removal of many abnormalities of the colon this method will be found simpler and safer than surgery.²⁹

In a diseased excretive organ it is not always the disease that is fatal; often it is the inability of the organ to carry on its function in a normal way, which results in the absorption into the body of those substances which should be expelled. This is well illustrated in the study of urinary metabolites, where death soon follows the inability of the kidneys to perform their excretory functions. The failure of intestinal excretion is not so immediately fatal, because of the existence of the functional drainage of the kidneys, skin and lungs, but the accompanying metabolic disturbances are equally disastrous. To combat disease successfully, the process of tissue change whereby the function of nutrition is effected, must not be overbalanced by the concurrent breaking-down processes—anabolism must not be overwhelmed by catabolism. To preserve this proper balance we must often resort to artificial elimination. It is my experience that many diseases usually considered chronic and fatal can be arrested,

if not entirely cured, by artificial drainage. I trust I may be pardoned for inserting here a statement offering confirmation of my point of view, which was published several years ago by one whose experience and standing in the medical profession lend prestige to his opinions:

“Schellberg has cured many very obstinate cases of intestinal infection and ailments resulting from the absorption of bacterial toxins. He has demonstrated conclusively the practical value of the long rectal tube for irrigation and cleansing the large intestine. X-ray photographs show clearly that such a tube may be passed through the colon as far as the cecum. We, as medical men, know that a large number of chronic pathological conditions are traceable to the absorption of putrefactive elements from the colon. These putrefactive elements are either bacterial toxins themselves or are formed by the action of bacteria on proteid matter held in the colon.”³⁰

Not alone can the colon be aided by irrigating its entire length; the effects of such irrigation extend to the ileum, the jejunum, the duodenum, the stomach, and even the throat. We do not need to stop at these; we can include the ductless glands, the heart, the blood-vessels, the lungs and the skin. In other words, we can include the entire body; and, I may add, in successfully combating any disease the alimentary canal is the most effective point

of attack. I do not refer to the use of the soap-suds or saline enema, or to the method of irrigation that is commonly prescribed and followed in homes and institutions by inexperienced persons. Anyone who prescribes such irrigations and expects any satisfactory or effective results is not possessed of a thorough knowledge of the anatomy, physiology and pathology of the human intestinal tube. There is no danger in irrigating a colon with a suitable rectal tube and equipment, *if the instruments are handled with sufficient skill*. But there is danger of injury, or even death, if the technic employed is faulty and the proper implements are lacking. Often, in a gastro-enteroptosis or other defect of the canal, the method used is to place the patient in the knee-chest position, thus causing the visceral organs to drop forward, and forcing the feces and gas out of the rectum and sigmoid up into the colon and ileum; then setting the patient upon a commode or having him walk to a toilet, with his abdomen distended with solution and the intestines dropping down, locking the gas and feces within the tube. Such treatment has often caused excruciating pain, collapse and death.

Hamburger's investigations have thoroughly explained the influence of intra-abdominal pressure on absorption, and the question of blood pressure was also considered. He increased intra-abdominal pressure by injecting physiologic saline

solution, and attempted to eliminate the elasticity of the abdominal wall by placing a plaster-of-Paris cast around the abdomen of a rabbit. At the beginning of the increase of intra-abdominal pressure he observed a rise of blood pressure, but when intra-abdominal pressure reached a high level there was a sudden fall in blood pressure followed by the death of the animal. It is known also that death may be brought about by an isolated loop in the lumen of the gut; so we can readily understand how injury, suffering, and death may follow from many specific causes. The introduction of a large amount of fluid into the lumen of the intestine when there is malformation of the tube, or even where a spastic condition exists, will form a large tumor with the increase of intestinal exudate and gases which are bound to follow in an isolated section of the lumen. When pressure is exerted in the abdominal cavity, the circulation, especially that in the veins, labors against increased resistance, and if the pressure against the larger veins is severe enough the heart will fail because it contains no more blood upon which to act. This is only one of the fatal injuries which may occur from increased intra-abdominal pressure.

Another ineffective method is the use of two rectal tubes. Why try to pass two tubes, when it is so difficult to pass one? This method is no more effective than an enema. The rectum, only, is

irrigated; and the patient is caused a great deal of discomfort. The ordinary method of irrigation employed does one of two things or sometimes both. It merely washes the feces out of the rectum, or by overdistention from the liquid forces them back into the colon—sometimes as far as the cecum. A very able physician, well versed in the anatomy and pathology of the colon, once inquired of a head nurse in a certain hospital:

“What is your technic of a ‘low irrigation,’ and technic of a ‘high irrigation,’ that you mention?”

“Why, doctor,” replied the nurse, beaming with confidence, “in a low irrigation, the douche-bag is held fifteen inches above the patient, and in a high irrigation the douche-bag is held three feet above the patient.”

Are we to condemn the nurse for her lack of knowledge, or should we condemn those who should have taught her better? We should condemn those who have written text-books, and put themselves on record, without having any more real knowledge of the colon, and the proper technic of its treatment than did this nurse. How many times has a “high, hot colon” irrigation been ordered? And how many times has a nurse or an orderly attempted to carry out the physician’s order with a rectal tube about fifteen inches long, that would bend on itself if it met with the slightest resistance, proceeding to put a hot solution into the intestine,

without having the slightest knowledge of colon physiology? The results of such treatment are written thousands of times upon hospital charts: "High, hot colon; no result." The physician's order to give the enema; the nurse's attempt to carry out his orders; the instrument with which she was provided and the hot solution she tried to put into the colon are all utterly futile. Hot solution in quantities amounting to over a few ounces cannot reach the colon, unless it has been cleared beforehand, as the solution will all be expelled by the rectum. The rectum's normal function is to expel any such solution immediately; and with such a tube as that with which the nurse is supplied it is impossible to reach the pelvic colon. One is amazed to read the assertions of certain investigators armed with x-ray equipment, who imagine they have proved to the world that a rectal tube cannot be passed beyond the sigmoid flexure. Truly, we need no x-ray to prove that such a tube coils on itself when introduced into the rectum; it requires but a limited amount of reasoning to realize that such a small, flexible tube cannot be passed. Nevertheless a proper rectal tube can be passed into the colon without difficulty by those who possess the essential skill, and are thoroughly conversant with the anatomy of the parts.

When the proper equipment to irrigate a colon is not at hand, instead of using an ineffective colon

tube, the patient should be placed on the left side, and a douche-bag with an ordinary hard-rubber tip pressed into service. Introduce a pint or two of solution at 37° C.; allow the patient to expel immediately; and clean the rectum of feces and gas; thereafter allowing the patient to rest for a half hour or an hour. This should be followed with another enema of a larger amount of solution, keeping the patient always on the left side. By this simple process the rectum will be relieved—and no doubt, the sigmoid also—of feces and gas, and the vermiform muscles will be stimulated to exert traction and further empty the bowel.

This can be done readily as often as is necessary without causing any ill effects whatever. I have frequently heard it said that a patient was “too weak to be irrigated.” A proper irrigation is not a shock, nor does it have any tendency to weaken. Why should it? On the contrary, it is stimulating; but to use a high-temperature solution in the colon of a patient who is suffering from an elevation of blood pressure or a cardiac defect is a dangerous procedure. In the same case, however, if the proper precautions are taken and a normal temperature solution employed, there is no danger other than that of adding a little more fluid to the blood stream.

The soapsuds enema stimulates peristalsis, and also supplies a lubricant, but it has no value as a

curative measure. An enema of normal saline solution does not even possess any of these qualities, nor is it as efficient in liquefying feces as is soapsuds. Glycerin is an irritant to the mucous membrane. Olive oil is of no value whatsoever; it is given as an emulsifier but actually it does not possess even this action. I have placed a piece of feces in a test-tube containing olive oil, and seen it retain its form for several days; the same feces in sterile water was softened within half an hour; with a solution of sodium carbonate it was dissolved more thoroughly, as was also the case with a solution of sodium phosphate; and a 20 per cent. solution of hydrogen peroxid became active at once.

What anyone can expect to accomplish by the single saline solution irrigation once a week which is so many times prescribed, I wholly fail to understand, for it often requires many successive days of daily irrigation with efficient medicated solutions to straighten out and clean a pelvic colon which is impacted with feces and adherent to the pelvic wall. Frequently, even before arriving at the splenic flexure when making the turn into the transverse colon, a large pocket may be found which contains a great quantity of offensive and decomposed feces and is ulcerated from the colonization of putrefactive organisms. It can readily

be seen how ineffective would be a saline irrigation applied without a proper rectal tube, when given but once a week, or even if it were given daily. Yet such a condition is only one of thousands which might be used in illustration.

It is impossible to classify the multitude of defects to which the visceral organs are liable. I will cite a few cases where the pathologic conditions have been adjusted, and the patients restored to perfect health by proper daily irrigations with suitable solutions (elsewhere described in detail), combined with adjustment of diet, and tonic medication prescribed by a competent internist. From one to six years have elapsed since the discharge of these patients.

Case I—X-ray Diagnosis.

No gastric delay (atony).

Duodenum retracted backward; defect on anterior surface; spasm of duodenum; second and third portions dilated.

Ulcer of duodenum.

Adhesions or bands involving the terminal ileum and cecum, and obstructing the drainage of these structures. Excessive ileac delay.

Chronic appendicitis; inflammatory extension upward to the inner side of the terminal ileum (adhesions).

Sigmoid very redundant, consisting of several loops.

Bacterial flora of the colon.

Bacillus coli (numerous).

Bacillus aërogenes capsulatus (numerous).

Streptococci.

Gram-positive bacilli.

Case II.

Intestinal toxemia.

Indicanuria.

Hypothyroidism.

Flora.

Bacillus coli.

Staphylococci (few).

Bacillus aërogenes capsulatus (numerous).

Gram-positive bacilli.

Case III.

General splanchnoptosis.

Dilated, ptosed myasthenic stomach.

Dilated cecum and ascending colon.

Transverse colon ptosed to pelvic floor.

Ptosed liver.

Ptosed right kidney.

Dilated, dropped duodenum.

General and colonic stasis.

Flora.

Bacillus coli (numerous)

Staphylococci (few).

Bacillus aërogenes capsulatus (numerous).

Gram-positive bacilli (few).

Case IV.

Indicanuria three plus.

Intestinal toxemia.

Cholecystitis.

Flora.

Streptococci (few).

Bacillus aërogenes capsulatus in considerable number.

Bacillus coli.

Gram-positive bacilli and diplococci.

Case V.

Spastic descending colon.

Spastic sigmoid.

Dilated cecum.

Congested liver.

Flora.

Staphylococci (numerous).

Bacillus coli (numerous).

Bacillus aërogenes capsulatus.

Gram-positive bacilli and diplococci (few).

Case VI.

Intestinal toxemia.

Spastic anus.

Atonic constipation.

Dilated cecum.

Inactive liver (bile insufficiency).

Hypotension.

Flora.

Staphylococci (numerous).

Bacillus coli and *Bacillus aërogenes capsulatus*, in moderate number.

Gram-positive diplococci and bacilli (few).

Case VII.

Duodenal regurgitation.

Marked indicanuria.

Atonic constipation.

Dilated hepatic flexure and first third of transverse colon.

Infected (pus) tonsil.

Beginning arteriosclerosis.

Flora.

An occasional streptococcus.

Bacillus coli.

Gram-positive bacilli.
Bacillus aërogenes capsulatus.
Staphylococci (few).

Case VIII.

Intestinal toxemia.
Nervous indigestion.
Gastroenteroptosis.
Right nephroptosis.

Flora.

Bacillus coli (numerous).
Staphylococci (few).
Bacillus aërogenes capsulatus in considerable number.
Gram-positive bacilli and diplococci.

Case IX.

Gastro-enteroptosis.
Lower end of pelvic colon adherent to rectum.
Dilated pelvic colon.
Angulation of splenic flexure.
Transverse colon, ascending colon and cecum dilated.
Blood pressure 240 (systolic).

Flora.

Bacillus coli.
Bacillus aërogenes capsulatus.
Streptococci.

Case X.

Spastic rectum.
Large dilated colon.
Marked meteorism.

Flora.

A saprophytic organism.
Bacillus coli (few).

Case XI.

Epilepsy, *grand mal*.

Large dilated stomach.

Retarded gastric motility.

Large dilated cecum and terminal ileum.

Flora.

Bacillus coli (numerous).

Staphylococci (few).

An occasional streptococcus.

Gram-positive bacilli.

Bacillus aërogenes capsulatus (numerous).

Case XII.

Gastro-enteroptosis.

Asthenic abdominal wall.

Prolapse of uterus.

Infected right ovary.

Flora.

Bacillus coli.

Staphylococci.

Bacillus aërogenes capsulatus (few).

Case XIII.

Asthma.

Spastic rectum and sigmoid.

Angulation of the splenic and hepatic flexures.

Pockets in transverse colon.

Large, dilated cecum.

Feces highly offensive, with odor of sulphur.

Flora.

Streptococci.

Staphylococci.

Colon bacilli.

Case XIV.

Hemorrhoids.

Ptosed rectum.

Large atonic colon.

Abnormally large cecum.

Flora.

Bacillus coli.

Staphylococci (few).

Bacillus aërogenes capsulatus.

Gram-positive bacilli.

Case XV.

Marked fecal stasis.

Coloptosis.

Cecum adherent to pelvic floor.

Flora.

Streptococci.

Staphylococci.

Colon bacilli.

Case XVI.

Distended abdomen.

Marked tympanites.

Hemorrhoids.

Large bleeding ulcer of pelvic colon.

Dilated transverse colon, ascending colon, and cecum.

Flora.

Bacillus coli (numerous).

Gram-positive bacilli.

Bacillus aërogenes capsulatus (numerous).

Staphylococci.

(Blood positive to benzidin).

Case XVII.

Marked gastro-enteroptosis.

Ptosed liver.

Spastic rectum, marked atony of colon with pockets.

Hemoglobin—40-50 per cent.

Flora.

Bacillus coli.

Staphylococci (few).

An occasional streptococcus.

Bacillus aërogenes capsulatus (few).

Gram-positive bacilli.

CHAPTER VI

TECHNIC OF COLONIC IRRIGATION

Local medication most effective in the colon—Necessity of clearing the gut before applying local treatment—Description of cecum tube—Apparatus for irrigation—Formulas for irrigating solutions—Purpose of the different solutions—Control of intestinal hemorrhage—Absorption of fluid—Coloptosis—Method of relief—Peristalsis as an aid in emptying the impacted cecum—Position of patient for irrigation—Method of advancing the tube.

CHAPTER VI

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In treating the defects of the colon, we must bring our efforts to bear directly, using both mechanical appliances and medicinal agents. This can be successfully accomplished through the rectum as, when the solutions are applied there, they do not undergo the changes that take place in substances given by mouth. Neither do they disturb the stomach or other organs. Actually but very few chemicals, when administered orally, ever reach the colon in a curative form. I find that antiseptics and other medicaments can be most effectively applied to the colon through the rectum, thus insuring their physiologic action without general systemic disturbance. An effective treatment

of acidosis, or of duodenal and gastric ulcers, etc., is by the use of antiseptics followed by four to eight ounces of sodium phosphate and an ounce of sodium salicylate in a quart solution (which produces a soft, lubricating, emulsifying solution) applied in the cecum. This can be given daily without any disturbance to the patient, and is a most useful method for producing general stimulation of the excretory tract.

The only way to clean an intestinal pocket, or to straighten an adherent loop in the colon, is by mechanical and antiseptic measures. For such conditions, my most important instrument is a 54-inch cecum tube (50-French), fitted with a pointed tip, shaped somewhat like a gunnery shell. This tapering point, when passed slowly into the colon, will slip off such folds as it may encounter, and the end being flexible, it is enabled to bend around sharp angles, while the body of the tube, being more rigid, makes it possible to lift the colon. Other tubes are required, as we must have both small and large, and these must also be soft and flexible so as to prepare the way for the stiff cecum tube. The cecum tube is rigid when new, but it becomes soft from sterilization, and, where a great number are used, runs a large scale in flexibility.

The irrigator consists of a swinging crane, a frame constructed to hold three glass tanks—one

three-gallon, and two two-quart—a small tank for antiseptic solution, and another for bacterial cultures. Each tank is equipped with a cover and with electric bulbs to keep the solution at a fixed temperature. Thermometers are hung from the cover to register the temperature of the solution at the bottoms of the tanks; while a four-prong glass tube is connected by rubber tubing with stop-cocks which are attached to the three tanks. A long rubber tube communicates with the lower glass prong, which in turn is attached to a three-way valve. One prong of the three-way valve is perpendicular, having two feet of rubber tubing for suction, conveying the outflow into a large bottle. The other prong, which points parallel to the patient, is provided with a tube-turner joined by means of rubber tubing to a straight glass tube used to connect the rectal tube. There is also an observation point where one may watch the return. The three-way valve rests on a folding arm, fastened to a special operating table provided with a flush and a glass bowl, with an electric light to facilitate the inspection and measurement of the discharge from the bowels.

After an experience extending over more than ten years I have found to be most satisfactory the alternate use of solutions made up by the following formulas:

First Day:

Solution in three-gallon tank:

Solution of chlorinated soda (dilute)*; temperature, 37° C.

Solution in small tank:

Colloidal silver,** . . . 1:8000; temperature, 50° C.

Second Day:

Solution in three-gallon tank:

Solution of chlorinated soda (dilute).*

Solution in small tank:

Two teaspoonfuls of the following solution to a quart of water; temperature 50° C.

85% phosphoric acid 3 drams.

Hydrochloric acid (C.P.) 6 drams.

Potassium permanganate 1 dram.

Distilled water enough to make one gallon.

Third Day:

Solution in three-gallon tank:

Mix: Solution of chlorinated soda (dilute).*

Sodium carbonate, 1 dram to the quart.

Solution in small tank:

Mix: Sodium salicylate $\frac{1}{2}$ ounce.

Sodium phosphate 4 ounces.

Temperature 50° C.

* Chlorinated soda is a solution of chlorid of lime (1 gm.) and carbonate of soda (2 gm.) in water. As Javelle water, it was first in use as a clothes bleach, but in the 40 years since its introduction it has also been known as Labarraque's disinfecting solution, chlorazene, Dakin's solution, and zonite. There is some slight variation in these different solutions. The solution was used 30 years ago in St. Luke's Hospital, New York, for cure of varicose ulcers. Dr. Frank Markoe used it in Bellevue Hospital, New York, 28 years ago as a hand solution and to scrub the skin before operating. I have used it in my work for the last 15 years for scrubbing operating tables, and as a hand solution and general deodorizer. The solutions listed in this work are based on the use of zonite (1:100 in water), a stabilized solution of chlorinated soda not in U. S. P. strength. In other forms the solution has a tendency to deteriorate rapidly.

** I have been employing the "collene" brand of colloidal silver.



FIG. 12.— Different sizes of cecum tubes. The upper instrument is called the *large cecum tube*; second, the *large colon tube*; third and fourth, *medium-sized cecum tubes*; fifth and smallest, the *tracer*. (Fifteen years of experimentation were required to perfect the shape of this point so that it could be readily passed into the cecum, and its production was only possible through the untiring assistance of Messrs. George Tiemann and Company, to whom I am much indebted.)

When using turpentine, kerosene, or any oily substance, mix with an ounce of ichthyol to eight ounces of water, which will form an emulsion. By uncoupling the rectal tube—the tube remaining in the bowel—this solution can be applied with a large, hard-rubber syringe through the rectal tube. Solution of emetin, three grains to a quart, should be used on alternate days with quinin, gr. 100 to the quart, when it is desired to destroy parasites, including ameba.

The solution in the large tank serves three purposes: First, as an antiseptic to wash the intestine; second, to clean the intestine of feces and gas; and third, to place and advance the tube. Therefore, its normal temperature should be such as to prevent unnecessary peristalsis. When the tube is placed, the high-temperature solution in the small tank is applied, if indications warrant a high-temperature solution. If in doubt, a normal temperature should be used, depending upon the existing conditions.

These solutions may be modified and changed as the conditions warrant. Where bleeding is present, the solution of colloidal silver in the small tank is used in the proportions of 1:4000. This solution is very effective in stopping hemorrhages and may be used daily. Bleeding from the colon is most commonly the result of ulcerations, but these ulcerations when properly treated will readily sub-

side. When the hemorrhage is from the pelvic colon, it is more apt to be bright red; farther up the intestine it is generally found in dark, almost black clots, but not necessarily so, since it depends upon the action of the chemicals and the placement of the tube, whether or not it comes in direct contact with the point of hemorrhage. When mixed with feces, the blood is dark brown, and its amount can be approximately estimated by the depth of the positive color reaction of the benzidin test. But in applying these tests, one must be mindful of the amount of meat in the patient's diet. The digestive juices must always be taken into consideration, as I have seen cases, where the patient was on a red meat diet, in which no positive blood reaction was found. On the other hand, I have removed quantities of solution colored red by the blood from a duodenal ulcer. I have also removed feces from the cecum which were bright yellow and showed marked blood reaction, likewise due to the bleeding from a duodenal ulcer.

The rectum, sigmoid and cecum are the most common points of hemorrhage, but we can find it in many locations in the colon, depending upon the anatomical defects which follow ptosis. The cecum is more often distended than any other part of the colon, angulation of the flexures being frequently the cause. When this distention exists, we may expect to find ulcerations in many forms, and

such phenomena as sharp pains in the vicinity of the hepatic flexure extending to the back on the right side, falsely suggesting gall-bladder disturbance, or pains and symptoms identical with those of an inflamed appendix. Though this condition can be easily detected, caution must be used in unloading a distended cecum, as perforation due to ulceration has occurred and has at times even caused death.

The solution in the large tank should contain solution of chlorinated soda (dilute), at 37° C., and in the small tank six to eight ounces of sodium phosphate and an ounce of sodium salicylate to a quart of solution at 50° C., the patient being kept on the left side. When irrigating, never allow more than a few ounces of solution to remain in the intestine at a time. The object is to open the flexures; and the feces and gases may be removed from the rectum and sigmoid, the splenic flexure opened up, and the transverse colon cleansed by siphoning. I have often given relief in this way, and have removed quantities of feces from the transverse colon, relieving the cecum, after reaching the splenic flexure.

When the transverse colon is sufficiently empty, fill it with the solution from the small tank, remove the tube, and raise the patient to a sitting position with instruction to relax the muscles but not to force a bowel movement. A quantity of fluid will

remain in the colon, and the following day great quantities of feces can be removed, as it generally requires from eight to twenty-four hours for a physiologic action to result from sodium phosphate and sodium salicylate. Following a violent distention of the cecum, some hemorrhage is likely to take place. When this occurs, a hot solution of colloidal silver should be employed.³¹

Absorption of solutions from the intestines is not merely a simple, physical phenomenon which can be sufficiently explained by the process of filtration or osmosis; it depends upon the vital activity of the intestinal epithelium. When the intestine is unable to expel the solution because of physical defects, the solution may be absorbed rapidly or, again, it may remain in the colon for hours. We know that when stasis exists, absorption is less rapid, but we also know that more solution is absorbed in the presence of stasis. When irrigating, it is well to bear in mind that intestinal distention increases absorption, and that in the colon some chemicals are more easily absorbed than others. A mixture of sodium salicylate and sodium phosphate is a powerful stimulant to fluid secretion by the villi fistulae of the colon and ileum, a comparatively small quantity of these chemicals being absorbed into the blood stream; but potassium iodid applied in the colon is absorbed into the blood stream within a few minutes after its administra-

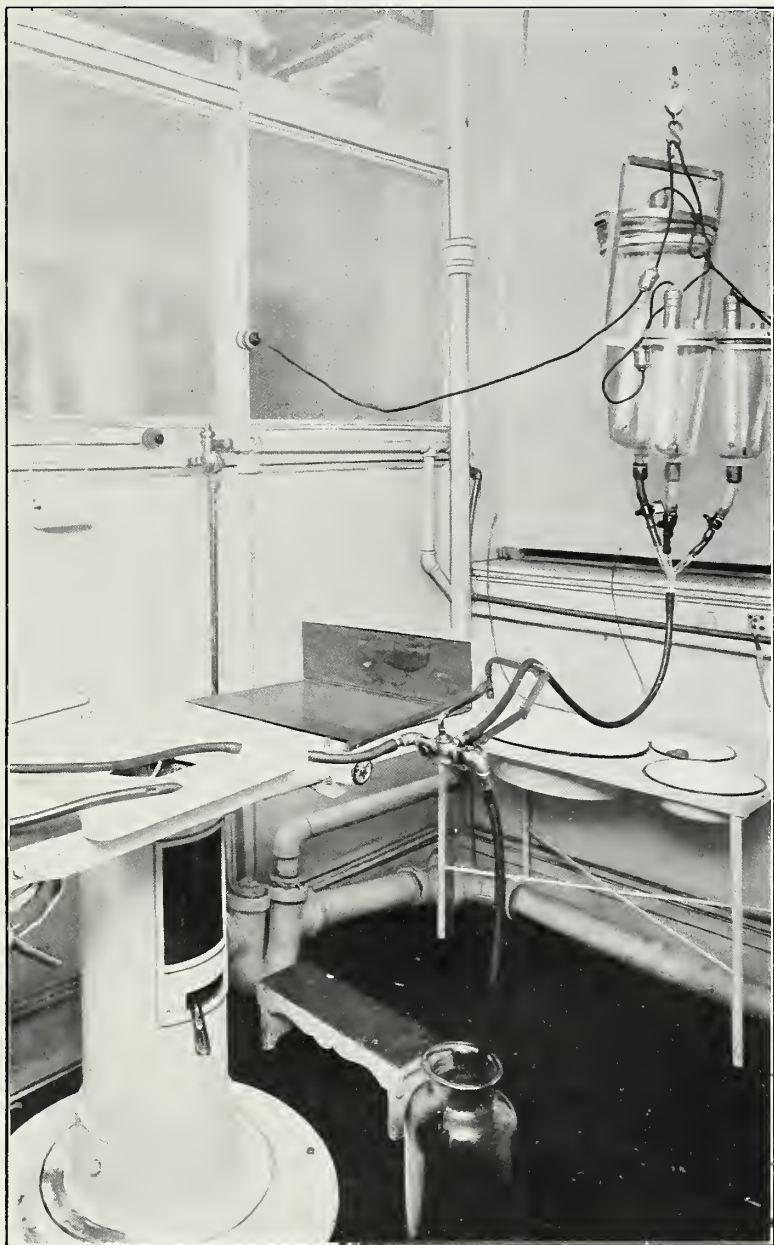


FIG. 13.—Operating table and irrigator, showing the three-way valve. When the treatment is concluded, the patient may be raised into the sitting position while still upon the table.

tion, producing iodism of the mouth. Solution of chlorinated soda (dilute) is practically a local antiseptic on the intestinal wall, as is also colloidal silver solution. Quinin administered in the colon in 100 grain doses can rarely be detected by the patient.

It is only when atony is present that the colon becomes ptosed, this ptosis being due to the relaxation of the muscles. In many cases of marked redundancy of the left colon I have found the cecum distended with residue very low in the right iliac fossa. The redundancy of the sigmoid is due to the continuous pulling of the physically deteriorated muscles in an effort to raise the impacted cecum. As these patients suffer from gas distention, regurgitation, vomiting and other distressing symptoms, relief can be given by passing the tube into the cecum. Very little tone is found in a colon thus afflicted, and the tube is more readily passed, due to the fact that the weakened waves and contraction of the intestine and transient sphincters of the colon are very easy to overcome with water-pressure, and when a portion of the gut is dilated it is very slow to contract. Caution must be used in this condition, however, since, if one is not careful, a great deal of solution is apt to be forced into the cecal region and cause distention at the wrong time. Where this condition exists, we find that a high-temperature solution of 50° C. applied in the

cecum or ascending colon will stimulate constricting colon waves, which cause the patient to expel huge masses of feces, otherwise irremovable. To produce peristalsis sufficient to empty the cecum, this solution must be applied in the cecal region.

In beginning an irrigation, place the patient on the left side provided the colon is not transposed. Wash off the rectum with a solution of carbonate of soda and chlorid of lime; then clamp the end of the rectal tube, sterilized and full of solution, with a sponge forceps; and lubricate the rectum with sterile white vaseline or, if it is spastic or if hemorrhoids are present, with adrenalin ointment. In any condition of the rectum insert the tube very slowly. Remove the sponge forceps and allow three or four ounces of solution to flow into the rectum. Reverse the three-way valve allowing the gas and solution to escape. Repeat, using the same amount of solution, or increasing it if necessary. Irrigate the rectum until the returned solution becomes practically clear. With the water flowing, advance the tube a short distance into the intestine; then reverse the valve and allow the solution to escape. Repeat this maneuver until the solution comes away practically clear. In this way progress can be made into the pelvic colon.

Distending the colon and forcing the folds of the intestine forward while the water is flowing is but one method of advancing. Sometimes the

condition of the intestine is not amenable to this technic. It may be necessary to distend the intestine, after which the reverse valve is thrown open allowing the water to escape, and passing the tube at the same time. In this way the intestinal wave will be encountered and the gut will slip over the tube as it meets the wave or contraction. In like manner, where a great quantity of feces and gas lies beyond the colon sphincter, when the tube has been advanced and has come in contact with the contracted portion of the intestine, it will be possible to distend the intestine, and then draw back the tube with the valve opened. By this method a transient sphincter of the colon may be induced to relax, and a wave will follow the tube which will allow the gas and feces to escape. When this is accomplished, the colon should be dilated and the tube passed simultaneously, before the gut has time to contract further.

The amount of solution put into the intestine should be carefully gauged, as often in certain conditions control may be lost; for example, perhaps a turn cannot be made at the splenic flexure, and the solution will flow over into a large redundancy in the transverse colon, and cannot be removed, and the resulting distention of the redundancy may cause a contraction and force the water still further over into the cecum, or—if the ileocecal valve is incompetent—even into the ileum. When

confronted with this condition, the tube must be drawn back a few inches and the flexure dilated. It will then be possible to siphon. If not, the tube must still be retracted. The patient being on the left side, gravity is in the operator's favor.

Again perhaps there may be a floating and stretched transverse colon, persistently ptosed to the left, which is weighted with feces and solution; this is likely to press against the tube and cause it to kink. If this or similar conditions occur, turn the patient on his back, carefully regulating the amount of solution allowed to flow into the intestine. Under these conditions, the tube must be passed with only a small amount of solution, frequently throwing open the outflow, until it is possible to siphon out the feces and solution locked in the intestine. In a large atonic intestine distended with feces and gas, the tube will often hug the upper surface of the gut where only gas is present. The solution when flowing into the colon will go to the bottom, and when the valve is reversed it will be found that the tube is filled with gas. The only way to overcome this is to remove the tube slowly, with the valve open (which permits the gas to rush out); then refill the tube with solution, reinsert it into the rectum; and continue as before. Allow but a few ounces of solution to flow; then reverse the valve. The gas may have followed the tube down to the rectum and here

it can be removed. When the sigmoid is reached, change the position of the patient, as by so doing any remaining gas will be more apt to be removed. A gas pocket in the intestine is generally coincident with the presence of feces, and is very difficult to remove.

It may sometimes be necessary to withdraw the tube wholly under these conditions. If so, distend the colon with hot solution, remove the tube, and allow the patient to expel. After this has been accomplished, the irrigation may be continued.

There have been so many inquiries as to the danger of passing cecum tubes in the colon, that I will avail myself of this opportunity to say that 120,000 treatments have been given in my clinic without the slightest injury or mishap, other than occasionally a slight local pain due to spasms or the opening of an angle, and this was felt only during the operation.

CHAPTER VII

SPECIAL APPLICATIONS OF COLONIC IRRIGATION

Colonic atony—Treatment of fecal impaction following milk diet—Causal organism in arthritis—Method of irrigating a spastic colon—Bacterial colonization—Irrigating in the presence of putrefactive foci—Stimulating effect of irrigation—Fecal impaction simulating malignancy—Irrigation when malignancy is suspected—Dilatation of colonic angulations and flexures—Preparation for x-ray observation.

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In many atonic conditions of the colon a tube can be readily passed into the cecum. An illustrative case is that of a boy fourteen years of age, who was confined to bed with a distended abdomen (the intestinal waves being apparently dormant), arthritis of eight weeks' standing, swelling of the joints, and a daily temperature range of from 101° to 102.5° F. The patient, who had been taken off a milk diet two weeks previously and put on a soft diet, was greatly reduced in weight. Though it was difficult to outline the colon so as to locate any fecal mass, dulness over the right iliac fossa was very marked. The simple passing of a tube containing a solution of chlorinated soda (dilute) at 37° C. through the colon caused the

expulsion of great quantities of gas with small fragments of feces and mucus. From the cecum, a large amount of variously colored feces was removed which included small white balls of milk curds. A quart of solution containing one ounce of sodium salicylate and six ounces of sodium phosphate at a temperature of 51° C. was applied in the cecum. As soon as the patient was placed on a commode the colon immediately contracted and expelled a large amount of dark-brown, offensive residue, including six hard white chunks as large as golf balls, composed of putrefying milk curds, which had accumulated and lain in the cecum for at least two weeks. These feces upon examination showed a marked streptococcus infection. Following the treatment the abdomen relaxed, so that it was easy to locate the organs, the dulness over the cecum disappeared, and the temperature dropped to normal that evening. After five similar treatments the joints were approaching their normal condition and there was no further rise of temperature. After treatment for two weeks with solutions of colloidal silver alternating with acid solutions made up according to the formula previously given, with the addition of a nightly compound carthartic pill containing one-half grain of calomel, the following mixture was administered at night:

One and a half ounces of castor oil; ten minims

of tincture of iodine; and three grains of menthol. This was followed by eight ounces of citrate of magnesia in the morning. A daily implantation of *Bacillus acidophilus* and *Bacillus bulgaricus* culture was made until eight plants had been given. A solution of sodium phosphate and sodium salicylate was given every fourth day as a cecum douche following an irrigation of sterile water. Implantations of culture were given three times a week for six weeks. *Bacillus acidophilus* milk was administered orally; at the end of this period, the patient's condition was normal.

The mechanism of the therapy in this particular case is easily understood, as the focus of infection was found in the cecum where curative measures could be applied without difficulty. The medications used were stimulants to the endocrine system and producers of metabolic drainage rather than direct systemic specifics. The conditions existing here were due to a streptococcus infection, though arthritis is not always produced by the streptococcus as several other putrefactive microorganisms, including staphylococcus, may be the primary cause of arthritis. The tube could be readily passed, as there was very little ptosis of the colon and the flexures were not angulated. If the same condition had existed in the cecum together with malformation and loops and angulation at the flexure and perhaps a spastic condition,

the results would not have been obtained so rapidly. As it is, it very frequently happens in irrigating that spasms of the pelvic colon make it painful to pass a tube beyond this spasm. Under such circumstances, it is advisable to use adrenalin ointment as a lubricant on the tube; and to employ a very weak solution of chlorinated soda (zonite, 1:500) with a solution of colloidal silver at 35° C., applied in the spastic sigmoid. A small rectal tube, known as a "tracer," is the best instrument for this purpose. The tube can be passed during the period of relaxation between spasms. During the spasm the outflow must be left open, and when relaxation takes place the water is thrown on, but no attempt made to pass the tube. If the spasm re-occurs, the outflow is again thrown open, careful observation being made as to whether the tube is free. When it is free, the solution may be turned on and the tube passed with as great speed as the feeling of clearance ahead allows. If the tube goes through the sigmoid, no further advance should be made, but the small tank with the solution of colloidal silver turned on and if possible, the contents of the tank emptied in the colon. The object of this is to dilate the constricted area with hot solution which, when expelled, will automatically apply itself to the distended wall of the intestine. In treating a spastic colon, the use of any irritating catharsis as an auxiliary should be



FIG. 14.—Roentgenoscopic view of colon, following examination and initial treatment. The figure shows the faint outline of a large fecal impaction in the cecum, which is resting against the redundant sigmoid. In the middle third of the transverse colon a faint shadow is visible. As the colon displays no sacculi, it is evident that the impaction of feces prevented the complete filling by the barium meal.

avoided, though a mild bland laxative may be safely given. The patient should be irrigated in the afternoon.

In a few days the spastic condition will usually subside, although it sometimes exists in a lesser degree until after the implantation with *Bacillus acidophilus* and *Bacillus bulgaricus* culture, when it always disappears. Very often there will be a spastic anus, which is almost always produced by inflammation or an ulcer within the rectum. This is, however, very easily eradicated, usually after only a few treatments. The necessity for daily irrigations will be apparent when we consider that we are aiming to reach the cecum, the portion of the alimentary canal which is the point most favorable for bacterial growth. Under normal conditions the bacteria spread downward through the colon, and when putrefactive microorganisms gain the ascendancy their presence involves the nerve centers and lowers muscular tone, producing stasis and retardation of the fecal current, even inducing incompetency of the ileocecal valve. Bacterial colonization may spread upward into the ileum as well as downward in the colon. No matter what obstacle lies in the way, before substantial results can be obtained this portion of the alimentary canal must be entered and when this point is reached not alone has the entire colon been cleaned but access has been gained to the terminal ileum.

If there is an ileocecal valve incompetency, dilating the cecum with a hot medicated solution automatically allows the application of solution in the ileum and the drainage of whatever putrefactive organisms exist there. There is no technic demanding more practice and experience than that of acquiring the "feel" that will enable the operator at the lower end of a 51-inch cecum tube to know that the tip of this tube is going clear, or that it is coming in contact with a transient colon sphincter, or other obstacles. Previously obtained experience will enable him to judge whether beyond this sphincter lies a mass of feces and gas, whether there is a constriction produced by a focus of a putrefactive microörganism forming an exudate upon the intestinal wall, and producing, by inflammation, a more sensitive area in the gut, or whether both the focus of infection and an impaction of feces and gas will be encountered.

If there is a transient sphincter of the colon, the flow of water in the gut will be checked, whereupon the tube must be pulled back a few inches, the valve thrown open, and if the sphincter relaxes there will be a return flow of feces. If not, dilate the intestine, and pass the tube forward, as the conical-pointed tube will aid in opening the sphincter. The valve should then be opened to see if the tip has passed beyond the transient sphincter. If so, the mass of feces and gas can be easily removed.

If, on the other hand, the constriction is produced by a focus of infection, the tip may not be able to pass this point. The medicated contents of the small tank should then be applied. After distending the gut to a point where the solution begins to flow slowly, remove the tube with the solution still flowing, and allow the patient to expel.

The passing of the rectal tube within the colon stimulates the intestinal villi fistulae to excretion. The presence of the tube and the flow of water upward raise the lumen and temporarily relieve the ptosis of the part, straightening out large and small invaginated areas, releasing retained mucus, intestinal interlining adhesions, and small impactions of embedded feces. The action of the antiseptic solution destroys the colonies of organisms which are causing the constriction, thus removing the exudate and releasing the impacted content. The daily passage of the tube to the cecum continually lifts the intestine into its normal position and the transverse colon is elevated into a superior arc.

The result of returning the intestinal organs to their proper relations and improving their muscular tone is clearly demonstrated in the roentgenoscopic view (Fig. 14 and 15). The patient was a woman sixty-five years of age who had taken a laxative every night for thirty years. She complained that for the preceding five weeks she had

suffered from loss of appetite, almost continual nausea, gas pressure and discomfort after eating, vomiting, dull pain in the cecal region, and a sensation of "goneness" and extreme exhaustion. Several doses of castor oil and calomel had failed to give any relief. Her appearance was suggestive of malignant disease and the abdomen was distended. Palpation showed a slight tenderness in the cecal region, and in the right iliac fossa was a rounded indurated mass the size of an orange, moderately tender to palpation, and fixed, so that it gave the impression either of a tumor of the posterior abdominal wall, or a sarcoma of the ileum. Roentgenoscopy showed a fair filling of all parts of the large intestine except the cecum, which cast a very pale shadow, indicating that the barium meal was not passing through the cecum in a normal manner, either on account of pressure from without, or because of occlusion of the lumen by the presence of a foreign body.

Three physicians of recognized authority, all of whom had made a diagnosis of possible malignancy, agreed that the colon should be thoroughly cleaned out. At the second treatment I was able to reach the cecum, and by making use of a solution of peroxid of hydrogen, with considerable manipulation was able to break up the mass, which proved to be an impaction of feces. The cecum was then irrigated with three gallons of chlorinated



FIG. 15.—Same case as Fig. 14, showing normal tone and position of colon after six weeks' treatment, using antiseptic solutions and implantations of *Bacillus acidophilus* and *Bacillus bulgaricus*. Sigmoid redundancy entirely reduced; well formed colon sacculi indicate restoration of a normal tonus. A transient sphincter is distinctly outlined, and the traction of the vermiform muscles, forcing the splenic flexure into a moving loop, is clearly evident.

soda solution, followed by two quarts of colloidal silver solution—1:8000—at a temperature of 50° C., which was allowed to remain in the cecum. As soon as the impacted fecal mass was removed, the patient for the first time in five weeks experienced relief from her most distressing symptoms. After thorough irrigation and disinfection of the colon and the implantation of *Bacillus acidophilus*, her whole appearance was greatly improved, and her general health is now excellent. The mass in the right iliac fossa has entirely disappeared and a second x-ray shows the barium meal normally filling the entire length of the colon, including the cecum.

Figure 14 shows the distinct outline of a cecal impaction resting against the large-sized floating sigmoid. This redundancy is doubtless due to the traction exerted by the vermiform muscles which have lost their tone and become stretched to such an extent that they are unable to raise the impaction. In Figure 15, the colon will be seen in a normal position, following six weeks' treatment with no other aid than the use of antiseptic solutions and the implantation of *Bacillus acidophilus* culture. The large redundancy has entirely disappeared. The well formed colon sacculi show that the tonus is normal in every respect; and a transient sphincter is clearly outlined, the taenia coli drawing the colon below the splenic flexure

into a moving loop. The pictures clearly demonstrate the fallacy of those who—because of lack of experience—claim that irrigations may dilate the colon. On the contrary, irrigations when properly administered actually offer the additional advantage of contracting the colon. Excessive residue—including bacteria—is removed and the passage of the colon tube stimulates the organ. The high-temperature solution increases the circulation, for, as the angles and kinks are removed, blood stasis is abolished in the veins running parallel with the intestine; a condition of angulation always tending to produce varicose veins and blood stasis. From impeded circulation will result malnutrition of the organ, which in turn causes a general atony, and this, it is needless to say, will be accompanied by fecal immobility.

Figure 16 illustrates the appearance of forty-six inches of rectal tube in the colon. I will describe the technic used in passing the tube as it is shown in this particular case, and how the peristaltic waves of the colon may not only be overcome but made available to assist in passing the tube.

Figure 17 shows the passage of a three-pint barium meal, outlining the colon's position, demonstrating that the cecum and ascending colon have risen in an attempt to expel the tube. From a faint outline of a shadow it can be seen that the vermiform muscle was contracting, thus raising the



FIG. 16.—Roentgenoscopic view of forty-six inches of rectal tube in the colon. The position of the colon here shown is only one of a great number which may be encountered in the course of high colonic irrigation.

cecum, while the photograph was being taken. This emphasizes the logic of my contention that the proper treatment is to apply hot solution in the cecum, and also provides a picture of what many a physician has ordered but never succeeded in obtaining, namely, "a high, hot colon irrigation." It likewise explains the feeling of relief spoken of by so many patients following the administration of a quart or more of 50° C. solution applied in the cecum, to be later expelled by the colon. The same idea was in the mind of Dr. Charles F. Stokes while discussing a paper read at the Yonkers Academy of Medicine, when he took exception to the figure used by one of the speakers who had likened the colon to an abscess. How, he asked, could this tubular organ be compared to an abscess? In his opinion, it more closely resembled a fistula, as in treating a fistula it would be necessary to treat its entire length. Just so, we must give attention to the entire length of the colon.

In the roentgenographic view, the tube is passed through a loop in the sigmoid. Such a loop can be widely dilated without causing much discomfort to the patient, or making it difficult to retain the solution when the fluid is thrown beyond the apex. The intestine is dilated, and the tube is passed through the splenic flexure, but before this flexure is reached the loop in the sigmoid must be

used as an additional force to further propel the tube. The loop is first dilated by the passing of the tube; the water is then turned on, and the pressure caused by the constriction of the loop propels the point of the tube still farther up the gut. The outflow is then released and the tube relaxes in the operator's hand; if the tube is not forced back, he will know that it has advanced. In this way the splenic flexure can eventually be reached.

The patient, who has heretofore been lying on his left side, is now turned upon his back. By this change of posture the splenic flexure is relieved of the weight of gravity, and added power of traction is given to the hepatic flexure, in this way aiding the tube to turn the angle, although the loop must still be used as a driving force to further propel the tube.

Figure 17 also illustrates the power of the vermiform muscles to contract the colon, as it shows them raising the cecum and ascending colon in an attempt to expel the tube and the barium meal from within their walls. This figure also demonstrates the expulsive power of the colon when the fluid and gases are allowed to escape following the dilatation of a part; the colon in the effort of expulsion will follow the tube and even slip over it. In this way the tip is advanced into the colon.

A transient loop of the colon may be retarded



FIG. 17.—Colon filled with a barium meal, showing contraction of the vermiform muscles in the act of raising the colon in order to expel its contents. A faint shadow outlines the path of the cecum, showing it in the act of rising as the picture was taken. In this case, previous palpation clearly indicated that the cecum lay very low in the right iliac fossa. The gas forced out by the entrance of the roentgenographic meal can be seen in the sigmoid, holding back the barium meal.

by a large amount of residue; if the intestine is in a weakened condition and unable to expel it further, the mass becomes an immovable impaction. The life and health of the individual depend upon the amount of residue, its quality and the ability of the intestine to remove the impaction, either entire by a single convulsive effort, or by fragments. If the loop is not emptied, the wall of the gut may become infected, and adhesions are liable to form which will make the impaction more difficult to remove. I have found that intestinal interlining adhesions may be removed by destroying the flora with antiseptic solutions at high temperature, the stimulation of the area causing motion of the part and producing increased circulation. Added to this, by the application of solution, we get a mechanical action in the distention and relaxation of the gut with its inflow and outflow together with the passing of the tube. The flexibility of the tube must be left to the operator's judgment. I find that at first it is better to use a tube that is sufficiently flexible to go through the loop, remove the feces and apply treatment, later employing a stiff tube to straighten out the loop by mechanical manipulation. It is of vital importance to remove an impaction at once, but more time is required to properly straighten out a loop.

When passing a stiff and heavy tube, the operator's movements must be very deliberate. A

skilled operator can easily detect the gut swinging in line to the tube, as in many cases where the pelvic colon is in a practically normal position a stiff tube can be passed to the splenic flexure. The curve taken by the tube depends upon the mobility of the sigmoid. If there is an angulation at the splenic flexure which it is desired to treat, but the sigmoid is floating and the tube carries the gut in a straight line from the rectum to the splenic flexure, it will be found impossible to make a turn into the transverse colon, for the tube will carry the flexure with it straight to the abdominal wall. This may be avoided by using a flexible tube and tilting the patient on the right side, thus enlisting the aid of gravity in making the turn. But on the other hand, if the sigmoid is not floating and the tube bows to the left, the point running central after passing the anterosuperior spinous process, there will be less difficulty in passing through the splenic flexure. Again, if the transverse colon is ptosed in a V-shape, a soft tube will have a tendency to point down to the pubes; whereas, on the other hand, a stiff tube slowly passed will be likely to raise the transverse colon and make it possible to reach the hepatic flexure. If the operator is not successful in arching the stiff tube he will not be able to pass it beyond the hepatic flexure, though a softer tube could be passed through the hepatic flexure into the cecum. The passage of

a softer tube through an intestine is not, however, as beneficial as that of a stiffer tube. A stiff tube tends to force the gut into a magnet-shaped loop, while a softer tube is controlled by the intestine and will adapt itself to its loops and curves.

To relieve an angulation of a gut the point of angulation must be reached with the tube. The solution is apt to run ahead of the tube and fill the intestine beyond the angle, so that it has little effect in the way of removing the constriction. But if this does not happen, the solution together with the tube will readily open any angle that is not due to malignancy.

When an angulation of the splenic and hepatic flexure is present, place the patient on the left side; if a stiff tube can be passed to the first afflicted point, the flexure should be carried as far as possible toward the abdominal wall, and then dilated. In this way the solution is very easily siphoned out. A high temperature solution can be used at this point for irrigating, and the stretching of the part will enable the antiseptics to be more effectively applied. When this point is sufficiently dilated to enable a tube to be passed through the flexure, if the tube is running straight across the abdomen, and the intestine sagging underneath, it will be found that solution will flow in, but none will flow out. However, the gut is open so that the patient can expel its content;

apply the hot solution, remove the tube, and allow the patient to evacuate. By thus applying the treatment, the hepatic angulation has also been treated by the solution. Once free access to this point is gained, substitute a stiff tube, which will now form an arc so that the point will arrive at the hepatic flexure at an angle better adapted to open it up. The patient's position when treating an angulation of the hepatic flexure may be either on the left side, or on the back, as conditions indicate.

In preparation for an x-ray of the colon, the patient should receive catharsis—castor oil followed by citrate of magnesia—and the colon should be treated by irrigations and cleaned as thoroughly as possible, the last irrigation being given an hour before the barium meal is ingested. It is utterly impossible to get a true picture of the colon when diverticula and pockets are filled with feces, and portions of the intestine are distended with gas, preventing filling with the barium. Often a patient will be sent for an x-ray of the colon without any preparation whatever, the roentgenographs later being adversely criticized for not revealing the true condition.

CHAPTER VIII

ANTISEPTICS AND BACTERIAL IMPLANTATIONS

Colonic "clean-up" and catharsis—Technic of bacterial implantation—Relative merits of *Bacillus acidophilus* and *Bacillus bulgaricus*—Value of bacterial implantations—Necessity for thoroughly cleansing the intestinal canal previous to implantation—Condition of patients after bacterial implantation — Bacterial cultures — Coincident administration of catharsis.

CHAPTER VIII

ANTISEPTICS AND BACTERIAL IMPLANTATIONS

Colonic "clean-up" and catharsis—Technic of bacterial implantation—Relative merits of *Bacillus acidophilus* and *Bacillus bulgaricus*—Value of bacterial implantations—Necessity for thoroughly cleansing the intestinal canal previous to implantation—Condition of patients after bacterial implantation — Bacterial cultures — Coincident administration of catharsis.

I find that after the colon is cleansed and prepared with antiseptic solution according to the method which I have described, an implantation of *Bacillus acidophilus* and *Bacillus bulgaricus* in the colon and the same cultures also administered orally in the form of milk are of great therapeutic value in allaying inflammation throughout the whole extent of the alimentary canal, with the resultant increase of systemic drainage. The colon is cleansed with antiseptic solutions for a period of ten days to two weeks and a compound cathartic pill containing a half grain of calomel is administered nightly.

The day previous to planting, one and a half ounces of castor oil containing ten minims of iodine

and three grains of menthol are given, followed by one or more compound cathartic pills at bedtime and a bottle of citrate of magnesia the following morning. That afternoon the patient receives an irrigation of sterile water in order that the irrigation tube may be placed in the cecum, or as high in the colon as is possible. Then an implantation of *Bacillus acidophilus* and *Bacillus bulgaricus* is made, a pint to a quart of culture solution with half a teaspoonful of lactose or dextrose, being used at a temperature of 50° C. Following the implantation, the tube is drawn back to the sigmoid, and the sigmoid distended with sterile water. This prevents the cecum from rising and expelling the hot solution. The hot solution in the cecum may cause a reverse peristaltic wave carrying the fluid into the ileum, if there is incompetency of the ileocecal valve. When the patient complains of distention of the sigmoid, the tube should be removed, the patient raised on the operating table, and allowed to expel, sitting up. After this has been accomplished he should be placed on the left side and a four ounce rectal plant of *Bacillus acidophilus* and *Bacillus bulgaricus* with half a teaspoonful of dextrose or lactose at a temperature of 50° C. should be made. This can be given with a percolator bottle and a catheter, and when the colon is perfectly clear of feces and gas, the hot solution will cause reverse waves which



FIG. 18.—This roentgenograph offers convincing evidence of the necessity of thoroughly cleaning out the colon before presenting a patient for roentgenographic examination. Many abnormalities can be made out, including exaggerated sacculi, angulations, an incompetent ileocecal valve, and a ptosed sigmoid.

sometimes carry the solution as far as the cecum. Following the implantation of the culture the patient should be turned on the right side so that gravity will aid in carrying the solution as far as possible. When the patient has been allowed to lie for fifteen minutes in this position the treatment is finished.

This procedure should be repeated daily for three days; then every other day for three weeks; then twice a week for three weeks; thereafter an occasional treatment as indications warrant. During this period four ounces of *Bacillus bulgaricus* or *Bacillus acidophilus* milk is also taken by mouth three times a day before meals. This culture-milk should be prepared from skim-milk, which, coming in contact with the acid of the stomach, forms clots, and serves as a carrier to convey the bacteria to the ileum and colon.

After an experience of many years in treating the colon with varying methods ranging from the giving of an enema consisting of different substances, up to the development of the technic which I now employ, I find the use of antiseptics the most valuable form of treatment. But it has been my experience that no matter how thoroughly a colon may have been cleansed the organ does not remain clear for any length of time. Varying wild growths of bacteria soon make it their habitat although in some cases where drainage was excep-

tionally improved, the patient's health has remained good. As a rule, however, the patient's condition would be satisfactory only as long as the irrigations were continued.

From the treatment of more than one thousand patients a year for the past four years, making constant bacterial examination of the fecal flora, and clinical observations in collaboration with physicians of highest rank in their profession, I have adopted the following practice of bacterial implantation, modified according to the results of continuous "checking up" on the fecal flora, and minute observation of the general systemic condition of the patient: An implantation of *Bacillus acidophilus* and *Bacillus bulgaricus* is made in the colon—the treatment described in the preceding chapters is in preparation for this implantation—for the establishment of a nonputrefactive organism is of enormous value in preserving health. The value of the results obtained from any treatment is greatly enhanced when the colon is adequately prepared and the bacillus properly cultivated and implanted. Examination of patients returning for an occasional treatment after an absence of one to eight years, following a course of treatment with antiseptic solutions and subsequent implantation of *Bacillus acidophilus* and *Bacillus bulgaricus*, has shown that a large majority of such patients were in perfect health, maintaining a good



FIG. 19.—Mixed culture of *Bacillus acidophilus* and *Bacillus bulgaricus*.

growth of *Bacillus acidophilus*. Some, however, though their health was greatly improved, still suffered from fecal stasis, notwithstanding the fact that they had a good growth of *Bacillus acidophilus*. Other patients had a very small growth of *Bacillus acidophilus*, yet their health was excellent, with no symptoms of fecal stasis. The rest of these old patients—about ten per cent—had a small growth of *Bacillus acidophilus*, and while their general condition was better than at first, still their state of health was far from satisfactory.

The colons of this last group of patients had varying growths of putrefactive bacteria; some corresponded to those of the original slide, while others had a greater and more virulent growth. These patients were referred back to their physicians who were thoroughly conversant with their conditions, and another course of irrigations was ordered in conjunction with a changed diet, regulation of the mode of living, of the amount of exercise and rest, and stimulation of both the circulatory and endocrine systems. In these patients, the physician recognized certain conditions that he was able to rectify by the administration of appropriate remedies, and under this regimen improvement was rapid and permanent with relief of the general static condition of the alimentary canal and with a good growth of *Bacillus acidophilus* present at the termination of the treatment. This

seems to indicate in a general way that had these remedies been applied during the patients' initial treatments it would not have been necessary for them to return.

The Results Obtained from the Implantation of Bacillus acidophilus and Bacillus bulgaricus.—Making a comparison between these two bacilli: Under the proper technic, *Bacillus acidophilus* can be readily grown in the colon and ileum and become permanently established there. The life of *Bacillus bulgaricus*, on the contrary, is very short; though, exceptionally, as when the patient's diet is largely of milk, such as buttermilk, it may persist for some time. *Bacillus bulgaricus* has, however, a quick and active fermentative value. The lactic acid that is abundantly thrown off by a luxuriant growth of *Bacillus bulgaricus* has a sedative action on the alimentary canal, and by producing this condition nontoxic absorption may be quickly obtained; whereas, when *Bacillus acidophilus* is planted alone, therapeutic results are not obtained so rapidly, as it takes weeks and sometimes months to establish a good growth. Following the implantation of *Bacillus acidophilus*, however, the record of increased growth of this organism in the intestines extends over a period sometimes as long as eight years. At the termination of this period the patient has a far better growth than immediately after the two months' treatment.



FIG. 20.—*Bacillus bulgaricus* in pure culture.

No matter how large a colony of *Bacillus acidophilus* is present in the alimentary canal, when fecal stasis exists, due to a mechanical defect of the tube, it is impossible to prevent putrefactive organisms from colonizing. To introduce *Bacillus acidophilus* without a thorough preparation of the colon is not logical. This is especially true where foci of infection are produced by organisms such as colon bacillus, streptococcus, staphylococcus, *Bacillus aërogenes capsulatus*, or other organisms that produce gases, for these gases cause tremendous distention which makes it impossible for the intestine to carry on its normal function, and produces abnormally large intestines with marked fecal stasis.

The results of my work have positively proved that a lasting growth of *Bacillus acidophilus* cannot possibly be produced in the colon by the administration of *Bacillus acidophilus* milk or other preparation of *Bacillus acidophilus* given by mouth; and, moreover, that no great mechanical value can be derived from such administration. Of the patients presenting themselves at my institution for treatment after taking *Bacillus acidophilus* milk for periods varying from one month to one year, some had a fair growth of *Bacillus acidophilus*, others had none whatever, and their health was not improved. Yet these patients gained rapidly under the technic and implantation of

Bacillus acidophilus, as described here, with the addition of their physicians' therapeutic supervision. *Bacillus acidophilus* given by mouth with large quantities of sugar of milk will produce a very good temporary growth in the ileum, but *not in the colon*, especially where the colon is diseased. Sugar of milk is absorbed by the ileum so that very little, if any, finds its way to the colon unless it is given in abnormal dosage. We must, likewise, consider the effect of the sugar of milk on the patient's general health. As we know, the cecum is a fertile portion of the alimentary canal for the growth of bacteria, and when this organ is cleansed of residue and the membrane stimulated and treated antiseptically for a certain period of time, large colonies of luxuriantly growing *Bacillus acidophilus* and *Bacillus bulgaricus* being thereafter planted in the cecum in a solution made of dextrose or lactose, the results are excellent. The advantage offered by the use of dextrose is that it produces less gas than does lactose, but lactose makes a better medium for the growth of *Bacillus acidophilus*. As toxemia is more marked when fecal stasis exists in the cecum than when the retardation is in the sigmoid, we get better results from a good growth of *Bacillus acidophilus* in the cecum. But as the cecum harbors more bacteria than any other part of the alimentary canal, it

follows that this part must be cleansed before we can obtain results.

Following a general clean-up, as described in the foregoing chapters, the implantation in the alimentary canal of organisms that produce lactic acid should produce the following results: A complete subsidence of inflammation in the alimentary canal, including the colon, occurring sometimes within a few hours after its administration; and in twenty-four hours, the ability to pass a rectal tube into a hitherto inflamed or spastic colon without the slightest discomfort to the patient. The amount of residue that follows for days and even weeks is enormous, indicating the institution of a general systemic drainage. The residue is generally very light in color, this color not being produced by the organism, but resulting from the good drainage of the ileum and colon, which prevents the residue from being retained in the colon sufficiently long for the color to change. Following an implantation, we get mucus from the ileum which is of a light yellow color, quite different from that of the colon whence we remove large dark-colored clots, the matrix consisting of mucus and membranous strips.

The following medium, I find, produces a rugged and luxuriant growth of *Bacillus acidophilus* for colon implantations:

Nutrient agar (Difco)*	9 grams;
Nutrient broth (Difco)*	26 grams;
Table salt	40 grams;
Glycerin	9 ounces;
Dextrose	89 grams;
7 slices toast in 1 qt. solution;	
Water to make 2 gallons.	
(Everything filtered.)	

The reasons for using toast are: First, in toasting bread, the starch is reduced to dextrin, a sugar in which *Bacillus acidophilus* thrives. Moreover, the toast solution never filters entirely clear, and the thick portions encourage dense colonizations, which are carried as such into the cecum.

The results obtained from the administration of catharsis in conjunction with irrigations during the clean-up, and their continuation following implantations, are of great value, as the sole purpose is to establish drainage. This is why catharsis with antiseptic properties (such as compound cathartic pills) is given during the clean-up, as it helps to stimulate the general endocrine system, particularly the liver, softening the feces so that they can be readily removed from the colon. The unpleasant effects of cathartics in conjunction with irrigations are relatively small. Because of the large amount of residue which follows the implantation of *Bacillus acidophilus* and *Bacillus bulgaricus*, it is necessary to give catharsis, but these

* Difco is an abbreviation for Digestive Ferments Co.

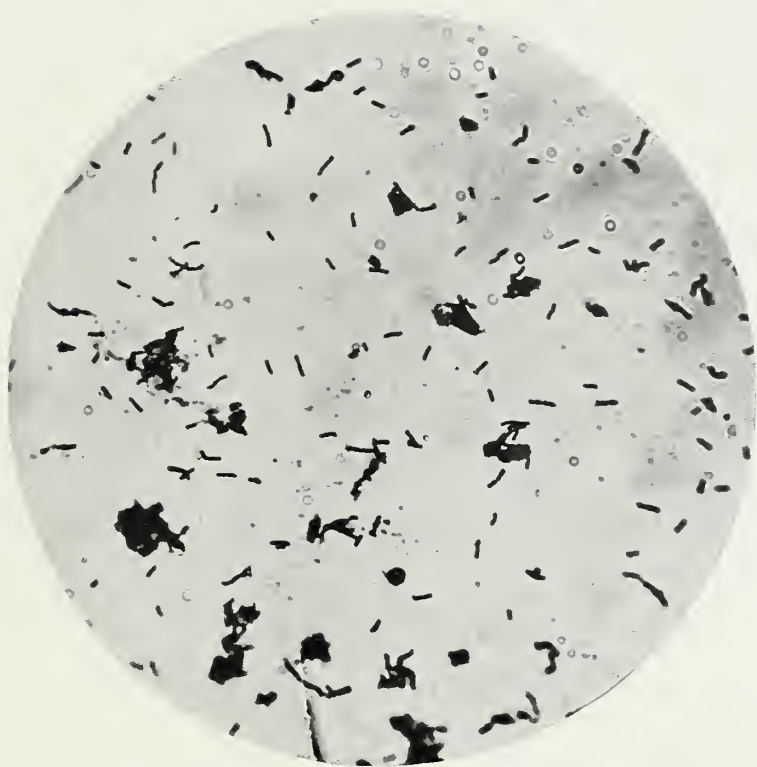


FIG. 21.—*Bacillus acidophilus* cultured in toast medium (stained by Gram's method).

cathartics should be nonantiseptic. When necessary, castor oil, citrate of magnesia, or compound licorice powder may be used to advantage. I find that suitable nonantiseptic cathartics are of great value in establishing permanent drainage and stimulating the colon. The catharsis is given in a maximum dose and gradually reduced as indications warrant until it can be altogether discontinued.

CHAPTER IX

FECAL STASIS AND ITS CONSEQUENCES

Fecal stasis a more accurate definitive than "constipation"—Ptosis primarily due to lack of drainage—Vermiform muscles of the human colon comparable to the muscles of serpents—Muscular atony results from fecal stasis—Distention and reversed peristalsis, more remote results—Alimentary substances may be absorbed by the blood stream, generating gases later on expelled by the lungs—Color and odor of feces—Recurrence after operation on intestinal tract often due to fecal stasis—Vomiting as a result of pathologic conditions in the colon—Position during sleep influences fecal stasis and coloptosis—Psychoses due to intestinal infection—Enervation of the colon—Origin of pain—Mental depression as a result of digestive imbalance—Vagotonia—Relief of mental symptoms by establishment of proper colonic drainage.

CHAPTER IX

FECAL STASIS AND ITS CONSEQUENCES

Fecal stasis a more accurate definitive than "constipation"—Ptosis primarily due to lack of drainage—Vermiform muscles of the human colon comparable to the muscles of serpents—Muscular atony results from fecal stasis—Distention and reversed peristalsis, more remote results—Alimentary substances may be absorbed by the blood stream, generating gases later on expelled by the lungs—Color and odor of feces—Recurrence after operation on intestinal tract often due to fecal stasis—Vomiting as a result of pathologic conditions in the colon—Position during sleep influences fecal stasis and coloptosis—Psychoses due to intestinal infection—Enervation of the colon—Origin of pain—Mental depression as a result of digestive imbalance—Vagotonia—Relief of mental symptoms by establishment of proper colonic drainage.

In some of the conditions commonly called "constipation," the term fecal stasis is more properly descriptive of that state of intestinal deficiency of which the amount or frequency of the bowel movements gives no just indication. A focus of infection inducing a metabolic imbalance, which is the direct cause of an intestinal disability, should surely be regarded as of itself a cause of disease. A focus of infection in the digestive tube can ex-

cite or deplete the action of the vagus and other nerves, thus producing muscular spasms or atony. The result of this combined imbalance—depending upon the degree of involvement—is sure to have a virulent effect upon the digestive tube. A person may have but three bowel movements a week, yet have no fecal stasis at any point of the tube; therefore, he enjoys good health. Another may likewise have but three bowel movements a week but suffers continual ill-health because of fecal stasis; still a third person may have three bowel movements a day, and yet display marked fecal stasis.

Fecal stasis is always secondary to an abnormality, which may be either a metabolic imbalance or a mechanical defect of the tube, or perhaps a combination of the two. Such a defect will inevitably constrict the tube and cause blood stasis. To understand this circulatory constriction we must bear in mind the fact that the vascular supply of the large intestine differs slightly from that of the ileum. There are fewer arterial arches, and there is a so-called *marginal vessel* running parallel with the bowel and sending off supply branches to that organ. It is evident, therefore, that when ptosis occurs, the prolapsed condition will interfere with the distribution of the blood to the entire area. When blood stasis exists there will be a general malnutrition of the affected area,

resulting in atony, with the inevitable sequence of fecal immobility.

Mechanical retardation of intestinal residue is undoubtedly the cause of more morbidity and mortality than all other physical defects combined. If it were possible to keep the digestive tube in perfect condition there would be little metabolic disturbance. The functional organs would suffer no disorders, as the metabolic outlet would keep pace with the metabolic intake. Thus, life would be limited only by the amount of physical endurance possessed by the individual, making perfectly possible the attainment of a life-span of hundreds of years.

The primary cause of ptosis is nondrainage. The colon, in parts, becomes overloaded and diseased at the same time, so that it is unable to properly contract and empty itself. If the terminal ileum is filled with feces and the ileocecal valve is incompetent, it is impossible for the cecum—however vigorous—to raise itself and contract. The muscular tone of the entire intestine will be lowered. This is also true of the vermiform muscles of the colon, which act much in the same way as rubber bands, keeping the muscles of the bowel shortened and thus regulating the colon's power of traction. The vermiform muscles of the human intestine have a grounding point in the pelvic colon, so that they are capable of exerting traction

upon the cecum in such a way that a low-lying colon is often drawn up into transient loops. Their action may be fitly compared to that of the muscles of the boa-constrictor, which must have its tail fastened to a tree or other grounding point, in order to contract its body in the act of crushing its prey.

The locomotion of serpents is carried on by undulations and archings of the trunk, all dependent upon the action of the vertebral column induced by the vermiform muscles. Richard Owen, writing more than sixty years ago, has given us a picture of the serpent's muscular powers, never since excelled. After describing the arching of the trunk which through flexion and extension enables the reptile to progress, he tells us that "if the act of extension be vigorous and sudden and an equivalent fulcrum be afforded by the tail, the whole body may be carried forward, as by a leap, farther than its own length. For the saltatory motion, however, the mechanism of a spiral spring is commonly simulated; the whole body is bent into a series of close-set coils, the sudden extension of which, reacting upon the point of earth against which the tail presses, throws the serpent obliquely forward into the air. . . . Serpents climb trees by the same mechanism and actions as in the first kind of locomotion . . . the tail has a prehensile faculty, especially exercised by the great constrictors

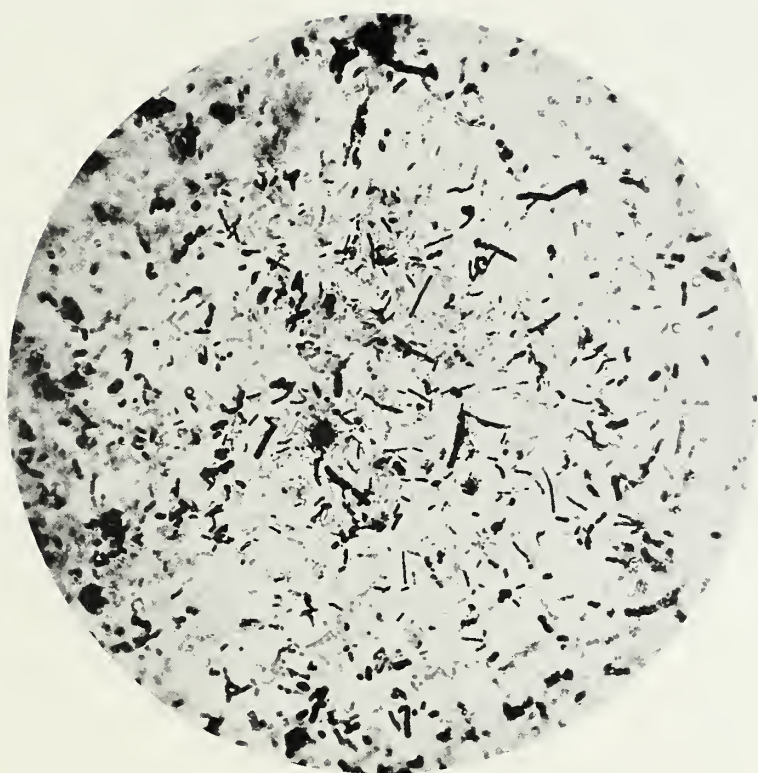


FIG. 22.—Fecal smear (stained by Gram's method) made after ten implantations of *Bacillus acidophilus*; the specimen shows a varied flora, with an average growth of the implanted organism. Examination of the first specimen taken from this patient had shown a predominance of *Bacillus coli* and staphylococci, with practically no *Bacillus acidophilus*.

while waiting for their prey. They instinctively select a tree at the part of the stream easiest of access to the thirsty mammals of the forest, and suspend themselves like a parasitic creeper, from an overhanging branch. . . . It is true that the serpent has no limbs, yet it can outclimb the monkey, outswim the fish, outleap the jerboa, and, suddenly loosing the close coils of its crouching spiral, it can spring into the air and seize a bird upon the wing. . . . The serpent has neither hands nor talons, yet it can outwrestle the athlete, and crush the tiger in the embrace of its ponderous overlapping folds." Truly a tribute to the power of the vermiform muscles!

We know that the function of the normal colon is to extract and absorb fluid. It accomplishes this more rapidly in its proper physiologic condition than when marked stasis is present. When a healthy intestine is distended with solution, it has the power to expel, but where stasis exists there will be varying amounts of residual solution when treatment has been completed. Generally in fecal stasis we find the entire colon markedly atonic; but when a spastic condition extends upward to the hepatic flexure, with an angulation at this point, we may expect to find a distended ascending colon and cecum. When the inflammation and partial obstruction are relieved, however, we will find no atony of the cecum. Dark clots of mucus, strips

of membrane and long strips of mucus sometimes measuring three or four feet in length are occasionally taken from the colon. Mucus of a very light yellow is a symptom of enteritis of the ileum. The long strips of mucus removed from the colon are formed by the invagination of the organ due to ptosis.

When we find a fecal impaction in the colon, or a general fecal stasis together with partial suppression of urine, the colon should be irrigated, caution being used so as to prevent the absorption of fluid before the colon is clean. Then a solution containing a half pound of sodium phosphate can be left in the cecum, which is bound to cause the colon to secrete a larger amount of fluid. If cathartics are used, we should give those that act upon the colon, avoiding salts and their derivatives, as they only stimulate the ileum to excrete fluid and cause added distention. Often the administration of cathartics will produce vomiting by the regurgitation of fluids into the stomach; and in any event will but add to the impaction, instead of relieving it. Vomiting can be induced by giving a hot enema if the rectum and sigmoid are spastic, as it will cause reversed peristalsis and nervous reflexes. Vomiting, nausea, regurgitation, and belching may be due to an overdistended cecum, or to an impaction or obstruction anywhere in the colon. Under such circumstances we may expect

to find reversed or mixed ileum waves. Artificial belching can be produced in some conditions by placing the hand on the abdomen and pressing against the ileum or duodenum, or the lower part of the stomach.

Sometimes in cases of intestinal fecal impaction one may find a brown-coated tongue and a typical fecal odor to the breath, or the tongue may be covered with a thick white coat, and the breath be heavy with the odor of feces. This odor, however, is not necessarily from the intestines. That such an odor can come from the lungs, I have proved by a personal experiment. Two hours after cleaning out my colon by a thorough irrigation, eight ounces of a solution of onion was applied in the cecum. Though there was no incompetency of the ileocolic valve, for twenty-four hours thereafter the odor of onions was distinctly discernible on my breath. By this simple demonstration we are able to appreciate the fact that the cecum causes absorption of alimentary substances into the blood stream, the gases from which are later expelled by the lungs. It does not, however, in any way disprove the assumption that feces may be carried from the colon into the ileum, or even through the stomach and esophagus to the mouth, by reversed peristalsis and regurgitation.

At times an enormous quantity of feces may be taken from the ileum and, in general, my experi-

ence has shown that the normal intestinal residue from different sections of the digestive tube may vary widely in color, odor and general appearance. This, of course, depends largely upon the pathologic conditions existing, and the amount and character of the food that the individual patient consumes, but, so far as the scale of chemical reaction is concerned, the conditions are not altered. The residue from the sigmoid and rectum has a marked fecal odor and is distinctly darker in color than that taken from the cecum; while that from the cecum is less offensive in odor, but darker in color than that from the ileum. Ileum residue is always light in color; and this light appearance is not materially changed unless the feces are detained in the colon.

An indication of an atonic cecum is the removal from that portion of the tube of dark-colored feces of offensive odor. If, following the cleansing of the cecum, the feces continue to be dark in color, it is a symptom of atony and fecal stasis, for the normal ileum residue is light colored and not of offensive odor.

More than once I have removed large amounts of feces from an impacted cecum and ascending colon, until all this portion of the intestine was clear of feces, only to suddenly discover that the cecum was rapidly refilling. On investigation I found that marked ileal waves had been caused by

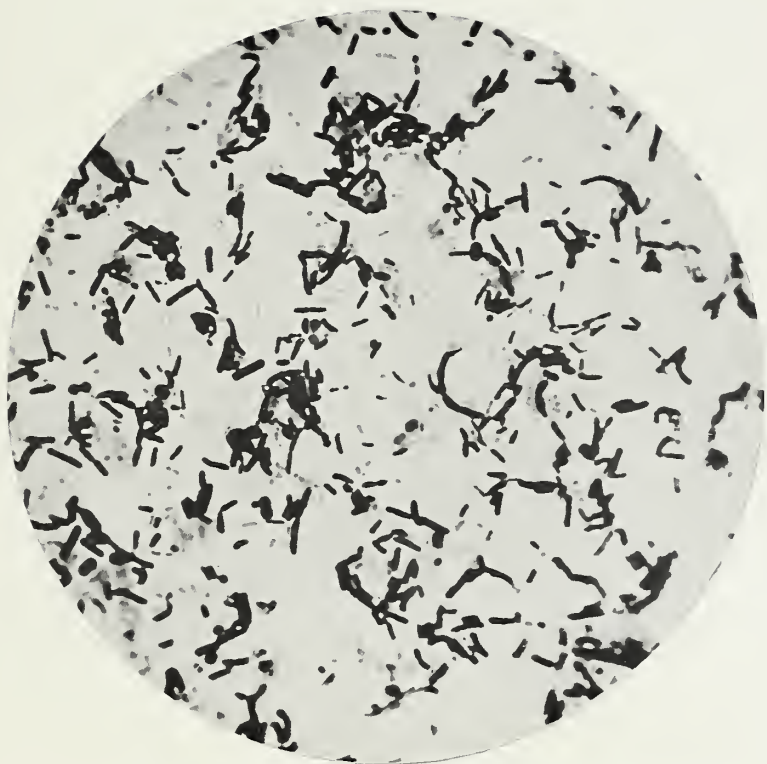


FIG. 23.—Fecal smear (stained by Gram's method) made three months after completion of a course of treatment. Exceptionally abundant growth of *Bacillus acidophilus*. At the beginning of the treatment, the patient, aged sixty-five, showed a fecal flora in which *Bacillus coli*, streptococci and *Bacillus aërogenes capsulatus* predominated, very few Gram-positive bacilli being in evidence.

the injection of the solution, and removed from the ileum great quantities of light-colored feces with strong fecal odor. It requires an average of ten days to completely remove the feces from the lower bowel, but when this is accomplished light-colored feces may be removed from the colon, and the odor will be much less offensive. The color may vary, depending upon the amount of bile and other endocrine secretions present, but the important indication is that the colon is cleansed of old mucus, putrefactive membrane and feces, material that, I have ample evidence to prove, has remained in the colon for weeks or even months.

Postoperative Recurrences—such as are only too frequent following interventions upon the gall-bladder or appendix, or the extirpation of a gastric or duodenal ulcer—are in the great majority of cases induced either by a direct focus of infection at the point involved; or secondarily, because fecal stasis has brought about a disturbance of the chemical balance of the alimentary tract, resulting in infection. Following any surgery upon the intestines the establishment of good drainage is absolutely essential, and without it no lasting benefit from the operation is possible. Even if recurrence of the primary condition does not take place, the operative sequelae may be so severe as to negate any benefit which could be derived from its abolition.

Vomiting is always the result of stimuli reaching certain centers in the medulla, but these stimuli may be either direct or indirect. For example, certain chemical substances act directly upon the medullary center, while others may take their origin in almost any part of the body—particularly the pharynx or throat, the gastric mucosa, or the peritoneum. Irritation of the duodenal mucosa is especially liable to elicit vomiting. An injury or other condition temporarily interfering with the stomach waves and thus allowing large quantities of gastric juice and unassimilated fluid to collect, will often produce a sudden attack of vomiting, causing intestinal waves or a spasm of the pylorus. The vomiting is the result of a convulsive spasm of the overdistended stomach.

An inflammatory condition of the ileum may cause either vomiting or diarrhea. In some conditions large quantities of excretion are discharged from the ileum, producing inflammation of the mucosa. A large convulsive inflow of contaminated bile into the ileum frequently excites vomiting. The emesis produced by overdistention of the colon from giving an improper irrigation or enema is accompanied by general cyanosis, sudoresis, and extreme exhaustion. Nausea, syncope and semicollapse may be produced by stimulating the colon with hot solution, thus causing it to expel at one movement a mass of impacted feces.

I know that the habit of sleeping always on the right side is the cause of a great deal of fecal stasis. I can tell by an examination of an abdomen in which coloptosis coexists with cecal stasis, whether or not the patient is a right-side sleeper, as the colon will be ptosed to the right of the median line, causing greater abdominal distention on the right side than on the left. Sleeping upon the left side favors drainage of the colon, and in right-sided ptosis enlists the aid of gravity in straightening kinks. Everyone should form the habit of sleeping alternately on the left and right sides in order to maintain a proper equilibrium. Where gastro-enteroptosis or coloptosis exists the foot of the bed should be raised with blocks ranging in height from four to six inches. Sleeping in this position not only relieves the ptosis, but also produces a general muscular relaxation of the body, thus tending to straighten kinks in the colon and to relieve the backache produced by ptosis as well as the lameness and swelling of the legs sometimes accompanying this condition.

The relation of diseased conditions of the digestive tract to disturbed mental states is only just beginning to be appreciated, but already the marvelous "cures" of those who had been regarded as hopelessly insane, simply by the abolition of pathologic intestinal conditions, has made a profound impression upon the medical profession. That

fecal stasis may be the basic cause of many obscure psychoses seems altogether probable.

The nerves of the alimentary canal are from the hypogastric plexus. Different authors vary slightly regarding the nerve control of the colon. But it is reasonable to believe that this portion of the alimentary canal is largely controlled by means of the pelvic plexus, a subdivision of the hypogastric. When the vagus is stimulated, it tends to intensify peristaltic action and increase the secretions of the intestinal glands. But the sympathetic or vegetative nervous system possesses a certain degree of independence of action of the central nervous system, the power to functionate resting in the plexus of nerves within the intestinal walls.

The intestinal tract, from the stomach to the rectum, receives sympathetic fibers from the lower seven thoracic and upper three lumbar segments of the cord.

The colon receives its stimulation from the nerves of the pelvic plexus, causing both a contraction of the muscles of the organ, and an increase in its glandular activity.

The idea that pain felt in the region of the umbilicus must be attributed to the ileum is not necessarily correct. Nor is it true that when the stomach is involved the seat of pain will be in the area immediately below and to the left of the ensiform. The impression that the pain area between

the umbilicus and the pubis signifies colon disturbance is also erroneous.

In order to trace pain to any of the visceral organs, we must first find the affected organ. If the stomach is ptosed and rests on the pubis and certain gastric tests increase the pain, it is reasonable to infer that the pain is in the stomach. If the splenic flexure is very high, and the colon is distended with gas which fills the area immediately below the ensiform on the left, this pain is caused by distention of the colon. Again, there may be an involvement of the terminal ileum complicated by ileal and mesenteric ptosis which will produce a pain in the vicinity of the umbilicus and pubes.

The pain so commonly attributed to an inflamed appendix, which is often felt in the right lower quadrant of the abdomen, is not necessarily an involvement of the appendix, for severe pain in that region may be produced by an infected or distended cecum, or marked disturbance in the terminal ileum.

When we take into consideration the network of nerves in the abdominal cavity, and the extreme ptosis of one or more organs not infrequently found, it is easily comprehensible how often it may be impossible to decide on the point of involvement by the localization of the pain. Pain on one side of the body is not infrequently a transference

of the sensory impulse on that side to the efferent sensory neurons on the other side, or a reflex to any other part of the abdominal cavity.

It is not at all unusual, however, to find cases of functional intestinal derangement where the mental depression is so severe as to be wholly beyond the patient's voluntary control, constituting an acute mental disturbance which is comparable in the mental sphere to a severe physical pain in the sphere of sensation. Nervous impulses arising in the abdominal cavity and passing to the brain along the vagal or sympathetic nerve paths have the power to directly disturb the mental condition on which the sense of well-being is dependent, and of giving rise to an acute mental distress which represents the physical pain which the subject would have felt if the afferent impulse causing the stimulation had been transferred from the vagal or sympathetic to the sensory nerves.

The fact that many mental disturbances are really due to functional derangement in the alimentary canal is demonstrable clinically by the fact that these conditions yield to treatment that lessens the amount of bacterial activity in the tube. Patients suffering from physical disability—various forms of nervous depression and excitation, and general endocrine imbalance—often manifest mental disturbance as well. Such a

syndrome has been postulated under the popular diagnosis of *vagotonia*.

This condition is well illustrated by a patient sent to me for treatment who was subject to uncontrollable crying spells arising without apparent reason. These attacks of mental depression would last for several days, during which time she would lock herself in a room, refusing food and medical assistance because on previous occasions medicine had failed to relieve her distress. On examination, a large loop in the colon at the hepatic flexure was detected. When a great quantity of feces had been removed from this loop, and it was kept clean by daily antiseptic treatments, improvement was so marked that the patient was elated. Unfortunately before the loop was straightened the patient was obliged to temporarily discontinue her treatments, and later returned, complaining that she was again unable to control her emotions. But when once more the detained feces were removed from the loop, immediate relief of the distressing symptoms took place.

Hypotonia is a common pathologic condition of the colon often involving the ileum, and is generally found to coexist with coloptosis. It is often so marked as to simulate complete atonia.

When vagotonia of the ileum coexists with hypotonia of the colon, it often produces severe abdominal pain during the act of defecation.

I have had many cases sent to me for treatment where the reflex contraction caused attacks of vasomotor angina pectoris. These patients were permanently cured by the establishment of proper colonic drainage, and in other interesting cases, clearly due to nervous disturbance arising in the alimentary canal, the correction of abnormal colonic conditions brought prompt and permanent relief of all mental symptoms. Frequently mental depression or excitation had been the only complaint, no symptoms referable to the intestinal tract having ever been manifested.

CHAPTER X

THE HUMAN MACHINE

The "chronic abdomen"—Hutchison's delineation—Adequate colonic drainage a cure for most uncatologued abdominal ills—Operation often avoided by abolishing fecal stasis and establishing a properly balanced fecal flora—Medicinal treatment unavailing without previous "cleaning out"—Abdominal asthenia—The effect of corset wearing—Alcoholic indulgence *vs.* muscular atrophy—Injurious effects of a saccharide diet—Campbell's views—The necessity for moderation and uniformity in eating—The care of the human machine.

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Aside from the cases of manifest alienation mentioned in the last chapter, the practice of every physician—be he a "specialist within a specialty" or a family doctor—is burdened with a class of patients which I was at a loss to describe adequately, until a short time ago my eye fell upon an address delivered by Dr. Robert Hutchison³² before the Clinical Society of Manchester, England, which was printed in the *British Medical Journal*. So perfectly has this English medical man painted the picture I have in mind that I shall take the liberty of reproducing *verbatim* much of what he has to say concerning the victims of the "chronic abdomen."

“Our surgical colleagues describe a condition which they speak of, in their clinical slang, as the ‘acute abdomen.’ There is, however, another condition more familiar to the physician which may be designated with equal propriety the ‘chronic abdomen,’ and if the one is, as we are told, a catastrophe, the other is certainly a conundrum.

“The subject of the chronic abdomen is usually a woman, generally a spinster, or, if married, childless and belonging to what are commonly termed—rather ironically nowadays—the ‘comfortable’ classes. To such a degree, moreover, do her abdominal troubles colour her life and personality that we may conveniently speak of her as an ‘abdominal woman.’ An abdominal man, on the other hand, is by comparison a rare bird, and when caught has a way of turning out to be a Jew—or a doctor.

“The symptoms of the chronic abdomen are many, various, and ever-renewed. Some of them refer directly to the abdominal organs, others are of a more remote and general character; but, whatever they are, they are always described with great prolixity and in minute detail. Amongst those most commonly complained of are abdominal aches and pains of various sorts and in various places, but especially in the right iliac fossa. Instead of actual pain the patient may speak of a ‘raw feeling inside,’ or of ‘an indescribable sensation in the

stomach,' or of a 'dragging.' Constipation of greater or less degree almost always figures prominently in the list of symptoms, and flatulence is also frequent. Amongst the commoner remote symptoms one finds a feeling of general weakness or 'exhaustion' (especially after an action of the bowels), 'mental and physical torpor,' 'inability to think,' 'a poisoned feeling,' and 'neuralgic pains all over.' Headaches and insomnia are also very frequent, and a great many patients complain of undue susceptibility to cold and of a constant catarrh in the throat.

"If one inquires of a patient with a fully developed chronic abdomen how her lamentable state has been arrived at, it will be found that the process of evolution is fairly constant. These sufferers are very fond of presenting anyone whom they may consult with a full record of their previous medical history and experiences. . . .

"The road to chronic abdominalism is paved with operations. The usual sequence seems to be this: the patient begins by complaining of pain or discomfort in the right iliac fossa, for the relief of which the appendix is removed. For a few months she is better. (It is characteristic of the disease that almost any new treatment, and especially any operation, produces benefit for a time.) Soon, however, her symptoms return. This is put down to 'adhesions,' and another operation is per-

formed to remedy these, with the same result as the first. Warming to his work, the surgeon undertakes bolder and yet bolder proceedings; a complete hysterectomy is probably carried out or some short-circuiting device, or the colon is fixed, or even partially removed, but still the patient is not cured of the pains, whilst the state of the nervous system has steadily worsened.

“It is interesting to note at this point how medical history repeats itself. Writing in the eighties of last century on the abuse of gynaecological operations in the treatment of visceral neurosis, Sir Clifford Allbutt said of the abdominal woman of that day:

“ ‘She is entangled in the net of the gynaecologist, who finds her uterus, like her nose, is a little on one side, or again, like that organ, is running a little, or it is as flabby as her biceps, so that the unhappy viscus is impaled upon a stem, or perched upon a prop, or is painted with carbolic acid every week in the year except during the long vacation when the gynaecologist is grouse-shooting or salmon-catching, or leading the fashion in the Upper Engadine: Her mind, thus fastened to a more or less nasty mystery, becomes newly apprehensive and physically introspective, and the morbid chains are riveted more strongly than ever. Arraign the

uterus and you fix in the woman the arrow of hypochondria, it may be for life.' *On Visceral Neurosis*, Goulstonian Lectures, 1884.

"Substitute 'surgeon' for 'gynaecologist' and 'appendix' for 'uterus' and the parallel is complete. At that time the uterine organs were the scapegoat of the abdomen; now it is the appendix—if, indeed, it is not already the teeth or the tonsils.

"Meanwhile, and between the more dramatic entries and exits of the surgeon, the physician has not been idle. The patient has been thoroughly 'investigated,' possibly at a 'team-work' clinic; she has certainly been provided with an x-ray picture-book of her entire alimentary canal; her teeth have been extracted and her tonsils excised; her motions have been analyzed by a biochemist and her mind by a psycho-analyst; she has had several rest cures; she has been given prolonged courses of vaccines, of intramuscular tonic injections, of intestinal antiseptics, and of endocrines; she has been fed on sour milk or minced beef or raw vegetables; she has experienced various forms of massage, has been subjected to the latest kinds of electrical current, and has had her colon repeatedly washed out at Plombières or Harrowgate.

"In a word, she has run the whole gamut of 'modern' therapy, has submitted to every 'stunt'

and conformed to every fad—but is none the better. And just as she can only escape the attentions of the surgeon when—as Sir Clifford Allbutt said of the gynaecologist—he is ‘grouse-shooting or salmon-catching or leading the fashion in the Upper Engadine,’ so she is only at peace from the physician when the latter is recruiting his exhausted energies by a short holiday at an inexpensive seaside resort.

“On examination of a fully developed case of the chronic abdomen one will find that it has both a physical and a mental aspect, and that the latter is often the more important of the two.

“Physically the patient is undernourished and sallow. To use an abominable term current at the moment, she looks ‘toxic.’ The abdomen is of visceroptotic shape and the surface criss-crossed with scars, the signs-manual of the surgeons who at one time or another have conducted exploring expeditions into the interior. The stomach is dropped and splashy and the right kidney more or less movable; there is tenderness at various points over the colon. Constipation will probably be obstinate, and the motions usually show the presence of mucus or even membranes.

“The mental side of the case is more difficult to analyse. There is notable, in the first place, a general discontent, ‘disgruntlement,’ and peevishness, added to which is an intense egotism which

leads the patient to regard herself and her symptoms as of the utmost importance. In a play called *The Mollusc*, which appeared some years ago, this aspect of the abdominal woman was admirably depicted, but I noticed that all my patients of this type who went to see it simply remarked, 'How absolutely like Mrs. So-and-so!' None of them recognized the Mollusc as herself. Needless to say, the patient is also intensely introspective and hypochondriacal. She studies and catalogues her symptoms with minute care, and is expert in a knowledge of the action of drugs and a connoisseur of doctors and 'specialists.'

" 'She has seen heaps of specialists,' a doctor wrote to me of a typical example, 'and no doubt will continue to do so. You will be amused and interested to hear that she promptly went off to another specialist after seeing you.'

"The operation habit has often a strong hold on her. Added to all this, and most trying of all, is an intense craving for sympathy which must be satisfied at all costs, and it is noteworthy that there is usually someone in her entourage who is always ready to supply the need. Sometimes an unmarried daughter is the victim; sometimes it is an over-devoted husband.

"Her incessant demand for sympathy and understanding makes the abdominal woman a veri-

table vampire, sucking the vitality of all who come near her. Half an hour with her reduces her doctor to the consistence of 'a piece of chewed string,' and is more exhausting to him than all the rest of his daily visits put together, for she is always discovering fresh symptoms, will not admit any improvement in her condition, and has an objection to everything that is proposed. Crabbe must have had her in mind when he wrote of the patients—

“ ‘Who with sad prayers the weary doctor tease
To name the nameless ever new disease.’

“Fortunately, however, she never sticks to one doctor long, but is always rushing off after fresh advice, and her nurses can always be changed at short intervals; if they were not, they would go mad.

“When one comes, then, to analyse a case of the chronic abdomen, it is found to consist on the physical side, of a state of visceroptosis along, usually, with a greater or less degree of mucomembranous colitis, and, on the mental side, of that morbid psychological state which was sketched above. But now comes the conundrum. How can the physical basis produce the multiform symptoms of which the patient complains, and what is its relation to the mental side of the picture?

“It is common knowledge, of course, that many women have pronounced visceroptosis without be-

ing much affected by it either physically or mentally. Why, then, do these particular patients appear to suffer so much? Again, what part does muco-membranous colitis play? It is true that one rarely sees a sufferer from that disease who does not exhibit in greater or less degree the mental characteristics of chronic abdominalism, but what is the relation of the one to the other? Does the colitis affect the mind, or is it the other way round? I need not remind you, of course, that there is a school of thought which would attribute all the remote physical symptoms of chronic abdominalism, and presumably the mental symptoms also, to 'auto-intoxication.' This doctrine has been so much discussed in recent years that I do not propose to weary you with a further consideration of it; but although there may be an element of self-poisoning in some of these cases, I feel bound to express the opinion that it will not account for all the symptoms. Nor have I any new theory to offer. There remains, when all is said and done, a good deal of mystery about the chronic abdomen, and it needs further study—especially, perhaps, from the psychological side and from the standpoint of the relation of the vegetative nervous system to the emotions. . . .

“What is to be desired is something which will dislocate the patient's mind from its perpetual revolution round her umbilicus and set it open to

wider horizons. The war cured some, and loss of fortune and bereavement have cured others; but these are drastic remedies which it is not within our power to prescribe. Suffragettism undoubtedly was the salvation of some abdominal women, but the suffragettes are now experiencing the tragedy of fulfilled ambition, and probably many of them have relapsed. Marriage, and the advent of a child—even an adopted one—are often potent remedies, and the fancy religions—Christian Science, Theosophy, Spiritualism, and so forth—may be ways of escape. One of my patients, an ex-nurse (and ex-nurses furnish the most malignant types of the chronic abdomen), once consulted a palmist, who after looking at her hand said: ‘If I were your husband I would take a stick to you!’ The advice was sound, and might often, perhaps, be effective.

“I confess, therefore, to some feeling of despair as regards the treatment of the more advanced cases of the chronic abdomen, and on the whole I am inclined to think that the less one has to do with them the better, both for one’s peace of mind, and one’s professional reputation. Yet, unfortunately, these cases are likely to increase in the future, for as civilization gets more complex, as fewer women in the upper classes marry, or, being married, have fewer and fewer children, all the factors which favor the development of chronic

abdominalism will be more intense. It is a bleak prospect."

It is noticeable that the bleakness of Dr. Hutchison's "prospect" is offered no alleviation by the proper correction of disordered conditions in the digestive tube. Though he mentions analysis of the chronic abdominalist's "motions" by a biochemist; and that she "has had her colon repeatedly washed out at Plombières or Harrowgate," there is no evidence that the "washing out" as practiced at the health resorts he mentions is in any respect thorough or adequate.

Had the cecum been reached and treated as it should be, every symptom he describes with such exquisite precision would have disappeared.

A neurotic is the product of a disease that the physician is not able to locate and the patient unable to describe. The condition that Dr. Hutchison pictures is found not alone among single or childless women, but likewise in married women, mothers, men, and even little children, irrespective of age or intelligence. A careful examination and the results of adequate treatment will prove that all these disturbances are caused by some intestinal infection. The majority of the men and women I have treated and helped to cure during the past ten years were in the condition described by Dr. Hutchison. Of the two hundred and eighty patients now under treatment no less than

one hundred and seventy are postoperative cases. In the last few years, a great increase in those coming after gall-bladder operations or gastro-enterostomy has been noticeable. Those who have undergone appendectomy and hysterectomy are in about the same proportion, but the number of tonsillectomy subjects is rapidly increasing.

The reason that the results of the great majority of appendectomies are unsatisfactory or altogether negative is that the extirpation of the appendix removes only a part of the diseased condition. The cecum—the original seat of the trouble—remains unaffected. The slight benefit generally obtained after operation is the result of the pre-operative preparation of the alimentary canal and the treatment by diet and other therapeutic measures following the operation. Many patients referred to me with a tentative diagnosis of appendicitis, were later—after colonic treatment—given a final diagnosis by the same physician of fecal stasis of the terminal ileum and cecum. And—most interesting of all—these very patients were so completely restored to health by the colonic irrigation and coincident medical treatment that operation of any kind was found wholly unnecessary. This gives me an opportunity to emphasize once more the chief value of the system of treatment heretofore outlined. In practically every diseased condition, no matter what therapy the attending phy-

sician may contemplate, thorough colonic irrigation, the establishment of proper systemic drainage and the cultivation of a normally balanced fecal flora will make possible the successful application of remedial measures, leading to more satisfactory results than can be obtained by any other means.

Sympathy, however, is with the surgeon, despite his demonstrated inability to cure an intestinal infection by removing an anatomical part. The physician has had his innings, and must yield the field to the surgeon. For generations he has attributed all intestinal disturbance to "biliousness," "constipation" and varying types of colitis, which are wholly inadequate descriptions of the conditions actually existing. He has prescribed medications which give merely temporary relief, yet had these remedies been administered after proper intestinal drainage had been established, they would have been powerful agents in restoring the patients to perfect health. Many a good remedy has been applied to a condition that did not exist, and a remedy highly effective in one condition may be of no use in another very similar; for example, the use of an abdominal belt for a postoperative ventral hernia. A belt is a good appliance to support the abdominal wall, but if put on with the idea of holding up the stomach, kidney, or any other viscus, it is not alone rendered wholly ineffective because of the anatomical structure and the re-

spiratory movements of the diaphragm and abdomen, but it also has a tendency to cause atrophy of the abdominal muscles. A similar condition of muscular atrophy is frequently found in corseted women.

The president of an association of mothers organized to dash the wine glass from the lips of the alcohol-soaked males—who by lowering their own powers of resistance, and thus permitting disease to destroy their vitals are the cause of so much misery and the bringing of imperfect children into the world,—this worker in a noble and spectacular cause, was sent to me for treatment. Her height was five feet four and at the age of forty she weighed one hundred and eighty pounds. The usual appendectomy scar was present, together with that of a suprapubic hysterectomy, which had been performed following the birth of her one child who had died at the age of six months, cause not stated. This patient was suffering from gastro-enteroptosis and abdominal asthenia, the condition being so marked that as she moved “off center” while lying on her back, her abdomen surged visibly from side to side. The amount of putrefactive residue which I was able to remove from her colon offered an ample explanation for all the headaches, dizziness and nervousness of which she complained. When I suggested that her physician prescribe a low protein diet, and that she stop

wearing corsets she gave the regulation answer. "I eat very lightly, and my corset is worn perfectly loosely. Besides, if I leave it off, my back aches." No amount of persuasion would change her mind; she insisted upon retaining her corset. It would have been far less difficult to persuade a drunkard to ignore the bottle. However, under treatment her intestinal condition improved; her headaches and dizziness disappeared; her blood pressure rose from 90 to 130; her weight was reduced by twenty pounds. Though it is now four years since she was under my care she is still in comparatively good health, and *still wears corsets*, while I am unable to get wine. Most men are not drunkards, but most women are corset-wearers. As abdominal asthenia is found as frequently in virgins as in mothers, the cause cannot be weakness of the pelvic diaphragm following the trauma incident to childbirth; and as it is rarely found in men, it seems reasonable to attribute it to corset wearing.

Strong alcoholic drinks are injurious, light wine and beer in moderation are tonics and less injurious than coffee, which is a drug, and to some who drink it, a poison. A corset prevents the normal abdominal movement of the wearer, and causes atrophy of the abdominal and pelvic muscles, thus destroying a naturally beautiful form, inducing abdominal asthenia and general pelvic disturbance; produces unhealthy mothers and childless

women; and causes far more disease and suffering than alcohol ever has. I should vastly enjoy "getting even with" those who are responsible for the loss of my wine, and at the same time improve the health of the coming generation by forcibly separating the women from their corsets.

It is an open question whether or not we made a good trade in substituting ice-cream soda and candy—records show that the United States eats more sugar than any other people—for light wines and beer. This substitution has entirely altered our diet, for without prohibition a greater portion of our population would drink beer or wine and eat cheese and crackers and the various salads. They would consume less food, and that food would be of an entirely different character from what is consumed at present. Our livers are capable of harboring a great deal of sugar; but what becomes of the surplus sugar we might be greatly interested to know. From my experience at least, it is certainly not producing a great growth of acidophilus in the average intestinal canal, and it is everywhere apparent that we are all getting fat.

That I am not alone in this opinion is evident in many quarters. Campbell,³³ an English writer, contributing to a system of diet and dietetics has this to say in regard to the effect of a highly saccharide diet:

“‘Meat’ and other kinds of animal food are often credited with being the cause of ill-health when the saccharide constituents of the diet are equally, if not more, responsible, for in many cases in which improved health follows upon the curtailment of animal food, an equally good, perhaps even a better, result could be obtained by cutting down the saccharides. Again, it is often contended that centenarians owe their great age in large measure to the fact of their having always eaten sparingly of meat, whereas it will generally be found that they have been just as moderate in regard to the other items of their food—indeed that they have observed moderation in most things.

“The fact that right up to the beginning of the agricultural period man’s supply of sugar was scanty, whereas during it, and especially within recent times, it has been enormously increased, suggests that ill-health may often result from its excessive consumption. Experience proves this to be the case; we are often able to effect great improvement in health simply by reducing the intake of sugar.

“The facts that within recent times the supply of vegetable food has increased more than that of animal food, that the softness of modern vegetable food favors its excessive consumption, and that enormous quantities of pure sugar are accessible, prepare us for the conclusion that the neo-man is

more likely to suffer from an excess of highly saccharide vegetable food than from an excess of animal food.

“The fact that during the entire period of his evolution from the simian, man’s vegetable food was eaten raw, whereas at the present day almost the whole of it is cooked, suggests that good may often result from increasing the proportion of raw vegetable foods, such as apples, bananas, nuts, and salads, all of which should be thoroughly masticated.

“The fact also that our vegetable food is so very much more concentrated now than it was in the time of our ancestors suggests the advisability of including a due proportion of bulky vegetable foods in our dietary.

“Before the period of fixed agriculture the quantity of food was not in excess of physical requirements, for though primitive man doubtless had his bouts of gourmandizing, he also had his intervals of enforced starvation; moreover, the constant quest of food entailed an active mode of life which rendered chronic over-eating impossible. There might be abundance of game, but it had to be hunted, the rivers might teem with fish, but the fish had to be caught; seeds and roots might be plentiful, but they had to be gathered. Hence, though in seasons of plenty primitive man may have grown plump, obesity was practically un-

known. These considerations suggest that though man is none the worse, and may, indeed, be all the better, for occasional dietetic indulgence, strict moderation in eating is the ideal to be aimed at.

“To put briefly the chief lessons to be learnt from man’s dietetic history: The ideal dietary should be simple in quality and moderate in quantity. It should contain a certain proportion, say from a quarter to a third, of animal food. Animal food requires little change, most raw vegetable foods and all cooked starchy foods, require a great deal. Hence, it is advisable to give most of the starchy foods in a form compelling vigorous mastication, and a certain proportion of vegetable food should be consumed uncooked. Care should be taken to guard against an excess of sugar.”

And not only *what* we eat, but *how* and *when* we eat it, has a great influence upon all the organic functions. In many cases, nonuniform meals cause impactions and fecal stasis, and our modern method of entertaining is undoubtedly very injurious to health. As a nation we are rapidly becoming “large-dinner-eaters.” We consume only a light breakfast, hurry through an inadequate lunch, and then conclude the day with an enormous dinner. We sit and chat, and stuff and stuff and stuff. This large dinner naturally goes down through the alimentary canal in enormous bulk

consisting largely of undigested food. Next day we have no appetite for breakfast or for lunch, but are ready late in the evening for another large dinner. A hasty, insufficient breakfast—consisting usually of a cup of coffee—produces few stomach waves; the hurried lunch likewise gives rise to no mechanical action in the alimentary canal. Therefore, we have fecal stasis, because we have not followed Nature's method of setting our alimentary canal at work. If we should eat a light evening meal, or none at all for a time, we should have a desire for breakfast, and when we ingest a normal breakfast, taking plenty of time for it, there is stimulation of the intestinal waves which tends to move our bowels so as to carry off the feces accumulated in the sigmoid during the course of the night. Subsequently there would be a better appetite for lunch, and we should be unable to eat a heavy dinner. In this way we should soon be able to eat about the same amount of food three times a day, the quantity consumed would be less, and its digestion better, and we should avoid great mass movements in the colon.

The trend of medical science today is toward the demonstration of the old adage: *An ounce of prevention is worth a pound of cure.* This tendency is so marked that it even seems possible that we may eventually come to the Chinese system of medical service, where the physician receives a

regular stipend as long as the family remains in good health, but has his pay promptly "docked" just as soon as any member of it falls ill. Although such drastic measures are not yet necessary, a similar tendency is everywhere evident in the attention being given to preventive medicine, and the realization on the part of both physician and layman that a rational mode of life, and the proper regulation of diet will do more to insure health than all the drugs contained in the pharmacopeia. The human body is an intricate piece of machinery, the aggregation of an infinite number of complicated parts. Every mechanic is aware that in order to functionate properly a power-producing machine must in the first place be well made, of good material and properly set up, and in the second place must be supplied with fuel of suitable nature and amount and kept *constantly cleaned and adjusted* so that it may give a maximum service, at a minimum of upkeep cost. The human machine is no exception to this rule. Life—its labors, hardships and pleasures—is its output, and the reason for its existence. Though the founders of this republic declared that we are all "born free and equal," the experience of those "trouble men" whose vocation is to overhaul the human machine and put it in order, leads them to the conviction that the mechanical equipment of some of us is vastly superior to that of others.

But it also teaches them that even when the engine is of poor construction, careful adjustment of parts, selected fuel, and, more than all, *a regular, thorough and systemic cleaning out of all the refuse of combustion* will go a long way toward keeping the product up to the desired standard.

To raise the general standard of hygiene; to make poor health good and good health better; to make it possible for succeeding generations to enjoy only the very best—this is the object toward which this small contribution has been made.

BIBLIOGRAPHY

1. DARWIN, CHARLES: The foundations of the origin of species, a sketch written in 1842. Cambridge (Eng.), 1909.
2. RUSSELL, E. S.: Form and function. London, John Murray, 1916.
3. OSBORN, H. F.: The age of mammals in Europe, Asia and North America. New York, 1910.
4. CRILE, G. W.: Man—an adaptive mechanism. (Edited by Annette Austin, A.B.), Macmillan Co., 1916.
5. STAPLEY, WILLIAM, AND MCKENZIE, WM.: A study of monotremes and marsupials to determine changes in the structure of the caecum and its vermiform appendix. Australian M. J., 15:401, Aug. 20, 1910.
6. FORD, W. W., BLACKFAN, K. D., AND BATCHELOR, M. D.: Some observations on intestinal bacteria in children. Am. J. Dis. Child., 14:354, November, 1917.
7. KENDALL, A. I.: Bacteriology; general, pathological and intestinal. 2d ed., Lea & Febiger, 1921.
8. DUVAL AND ROUX: Arch. des. Mal. de l'App. Dig., 10:795, 1920.
9. STAUFFER, W. H.: Mucous colitis. J. A. M. A., 7:1496, November 27, 1920.
10. FLEMING, GEORGE: Chauveau's comparative anatomy of the domesticated animals. 2nd English ed.,

- D. Appleton & Co., New York, 1891. Leyh: quoted by Fleming (p. 491).
11. ELLIOT AND BARCLAY-SMITH: J. Physiol., 31:272, 1904.
 12. FERGUSON, J. S.: Normal histology. D. Appleton and Co., 1909.
 13. BUNDY, E. R.: Anatomy and physiology. 5th ed., P. Blakiston's Son & Co., 1923.
 14. BASSLER, A.: Diseases of the Intestines. F. A. Davis Co., 1920.
 15. ALVAREZ, W. C.: Mechanics of the digestive tract., P. B. Hoeber, New York, 1922.
 16. JACOBI: Arch. f. exper. Path. u. Pharmacol., 27:147, 1890.
 17. CANNON, W. B.: The mechanical factors of digestion. Longmans, Green and Co., 1911.
 18. CASE, JAMES T.: The x-ray investigation of the colon. Surg. Gynec. & Obst. (Internat. Abst. Surg.), 19:581, December, 1914.
 19. KELLOGG, J. H.: Colon hygiene. Good Health Pub. Co., 1916 (p. 92).
 20. SCHELLBERG, O. B.: Systemic disturbances due to colonic infection. Am. Med., 17:636, Nov., 1922.
 21. CAMMIDGE, P. J.: The faeces of children and adults. Wm. Wood and Co., 1914.
 22. STOKES, C. F.: Am. J. Electrol. and Radiol., 41:73, March, 1923.
 23. TAYLOR, F. B., AND ALVAREZ, W. C.: The effect of temperature on the rhythm of excised segments from different parts of the intestine. Am. J. Physiol., 44:344, 1917.
 24. CASE, JAMES T.: Loc. cit.

25. LYNCH, J. M.: Diseases of the rectum and colon. Lea and Febiger, 1914.
26. GANT, S. G.: Constipation, obstipation and intestinal stasis. 2nd edition, W. B. Saunders, 1916.
27. HURST, A. H.: Constipation and allied intestinal disorders. 2nd ed., H. Frowde, 1919.
28. PFAHLER, G. E.: Adhesions and constrictions of the bowel; their demonstration and clinical significance. J. A. M. A., 59:1770, Nov. 16, 1912.
29. SCHELLBERG, O. B.: The incorrigible colon corrected by medicated irrigation. Internat. J. Surg. 35: 208, June, 1922.
30. GALLAND, WM. H.: The Schellberg treatment for chronic colonic infections. N. Y. Med. J., 114: 106, July 20, 1921.
31. SCHELLBERG, O. B.: Technic of colon irrigation. Internat. J. Surg., 36: 18, January, 1923.
32. HUTCHISON, ROBERT: The chronic abdomen. Brit. M. J., 1: 667, April 21, 1923.
33. CAMPBELL, HARRY: The evolution of man's diet. Contained in A System of Diet and Dietetics. Edited by G. A. Sutherland, Oxford Med. Pub., 1908.

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